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KEY TO PLANT GALLS FROM INDIA

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This paper presents simple, dichotomous keys to the plant galls from India. Over 700 different galls have so far been described from our flora and their identification is often a matter of considerable difficulty even for the specialist. It is hoped that these keys will prove useful to the student of cecidology. As may be expected, the keys are largely artificial and do not pretend to arrange the galls under a natural system. They have on the other hand been constructed merely as aids for the ready identification of a specimen on hand. The keys are arranged under the Natural Orders of plants and a general acquaintance with our flora is presumed. The characters included in the contrasting couplets of the keys are readily observed and do not necessarily describe a gall fully. For fuller accounts and details of the anatomical structure of galls reference may be made to my Cecidotheca indica*. My collections of plant galls, both Indian and exotic, are deposited in the Botanical Survey of India, Calcutta and are thus available for reference.

MENISPERMACEAE

1. Shoot axis gall 2
   Flower gall . .. 3
2. Solid, succulent, yellowish-green glabrous outgrowths on branches of *Tinospora cordifolia* Miers., 5-15 mm long, 10-20 mm thick : Gall No. 374 by Cecidomyiid.
3. Solid, fleshy, densely villous swellings of staminate flowers of *Cocculus hirsutus* Diels : Gall No. 349 by *Schizomyia cocculi* Mani.

BERBERIDACEAE

1. Bud gall 2
   Shoot axis gall 3
2. Subglobose, fleshy, unilocular, thick-walled swelling on *Berberis lycium* Royle, with imbricating fleshy scales ; 5 mm thick : Gall No. 420 by Trypetid.
3. Globose, solid, hard, woody rindengall on *Berberis lycium* Royle, 20-25 mm thick, sometimes 30-50 mm : Gall No. 425 by fungus.
   Unilocular swellings wholly under the epidermis of the branch of *Holboellia latifolia* Wall., becoming exposed when mature by the bark breaking off in pieces ; numerous galls develop close together : Gall No. 423 by Cecidomyiid.

FUMARIACEAE

1. Fruit gall ; subcompressed, inflated, legume-shaped swelling of the ovary ; gall cavity with fleshy emergences ; mature gall about 10 mm long, 5 mm thick, with vestigial style apically ; on *Corydalis cornuta* Royle : Gall No. 588 by Cecidomyiid.

PAPAVERACEAE

1. Hypophyllous, lobed, cottony pouch gall on leaf of *Argemone mexicana* Linn., with ostiole epiphyllous ; 8 mm thick : Gall No. 758 by *Eriophyes* sp.

CRUCIFERAE

1. Root gall 2
   Bud gall 3
2. Subglobose rindengall on *Brassica campestris* Linn., solid, fleshy, 5-30 mm thick : Gall No. 567 by *Urocystis brassicae* Mundkur.
3. Irregularly globose, solid, fleshy, tuberculated swelling on *Brassica juncea* Hook. & Thoms., 5-25 mm thick : Gall No. 357 by *Phytomonas tumefaciens* Sm. & Towns.

CAPPARIDACEAE

1. Root gall .. 2
   Gall on aerial parts 3
2. Irregularly fusiform swellings, mostly of the lateral roots of *Gynandropsis pentaphylla* DC. : Gall No. 302 by *Heterodera marioni* (Cornu & Goodey).

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* Mani, M. S. 1959. Cecidotheca indica. *Agra Univ. J. Res.*, (Sci.) 8 (2) : 91-280, pls. xxxii, figs. 60.

3. Gall on shoot axis 4
Gall not on shoot axis 7

4. Regular swellings of branch 5
Irregular and unilateral swelling of branch 6

5. Globose, brown, hard, woody, solid swelling on *Capparis aphylla* Roth, 10-20 mm thick, with narrow tortuous cavity : Gall No. 149 by Lepidoptera.
Similar to Gall No. 149 but larger and on branch of *Capparis brevispina* DC. : Gall No. 150 by Lepidoptera.
Similar to Gall No. 149 but on *Capparis stylosa* DC. : Gall No. 151 by Lepidoptera.
Much larger, greenish-yellow or reddish-brown, glabrous swelling on *Capparis sepiaria* Linn. : Gall No. 405 by Lepidoptera.

6. Solid, localized or extensive swellings of branches and sometimes also of petiole and midrib of *Capparis viminea* Hook., fleshy when young but woody when mature, 5-12 mm long, 5-8 mm thick : Gall No. 170 by *Oligotrophus indicus* Kieff.

7. Gall on vegetative organs .. 8
Gall on flowers, fruits, etc. 15

8. Bud gall 9
Leaf gall 10

9. Subglobose or pyriform, solid, succulent swollen masses of terminal or axillary buds of *Crataeva religiosa* Forst., greenish-yellow or pale yellow, with fleshy rugosities ; 5-15 mm in size : Gall No. 171 by *Aschistonyx crataevae* (Mani).
Subglobose or conspicuously biconvex, semi-solid, fleshy, pale green or yellowish-green swellings on *Cleome monophylla* Linn.(?) clothed with numerous glandular hairs ; 3 mm in diameter : Gall No. 470 by Cecidomyiid.

10. Covering gall 14
Pouch gall or fold gall 11

11. Leaf fold gall 13
Pouch gall .. 12

12. Epiphyllous, globose out-pocketing on *Cadaba indica* Lamarck, with fleshy rugosities, green, cavity partly filled with white erineum ; ostiole hypophyllous, large, wide open ; 10 mm in diameter : Gall No. 4 by *Eriophyes* sp.

13. Solid, compressed, legume-shaped, deep pink-red succulent swellings of the leaf blade of *Capparis sepiaria* Linn., folded along the midrib upward ; 20 mm long, 10 mm wide, 5 mm thick : Gall No. 169 by Cecidomyiid.
Egg-shaped, solid, spongy, parenchyma swelling of the folded halves of the leaf blade of *Merua arenaria* Hook. & Bl., 40 mm long, 15 mm thick, glabrous, yellow or yellowish-green ; with a narrow marginal area of the blade and the leaf tip remaining as flat wing-like processes on one side ; the gall has a superficial resemblance to a fleshy legume ; larval cavities numerous : Gall No. 173 by *Schizomyia meruae* Felt.

14. Solid, fleshy, crenulated swellings of the three leaflets of *Crataeva religiosa* Forst., mostly basally but sometimes also of the whole blade and greatly similar the gall on bud : Gall No. 171 by *Aschistonyx crataevae* (Mani).

15. Flower gall 16
Gall on ovary or on fruit 19

16. Gall fleshy and succulent 18
Gall hard and woody 17

17. Subglobose, solid swelling of the thalamus and the base of the gynophore of *Crataeva religiosa* Forst., often also of the entire flower, flattened above, sometimes agglomerated, with irregular, fleshy, subconical tubercles representing the vestiges of sepals and petals ; 20-30 mm ; yellowish-green to brownish-yellow and sometimes also tinged red : Gall No. 172 by *Neolasioptera crataevae* Mani.

18. Subglobose or discoid, semi-solid, fleshy, parenchyma swellings of whole flowers of *Crataeva religiosa* Forst., with the bases of petals, filaments of the stamens, sometimes also the anthers, ovary, style and gynophore swollen ; 10-15 mm thick : Gall No. 334 by *Aschistonyx crataevae* (Mani).

19. Baccate or inflated hypertrophy of the ovary of *Polanisia viscosa* Linn., characterized by chloranthy and phyllomany ; 30 mm long and 10 mm thick ; with fleshy emergences and erineum inside : Gall No. 3 by *Eriophyes* sp.

BIXACEAE

1. Pouch gall .. 2
Horned sublenticular gall .. 3

2. Epiphyllous, bullate, thick-walled gall on *Hydnocarpus wightiana* Bl., 2-20 mm long, 2-12 mm in diameter ; greenish-yellow ; ostiole hypophyllous, non-operculate and wide open ; cavity large, with erineum white first and turning on maturity to brown : Gall No. 339 by *Eriophyes* sp.

3. Circular, biconvex, sublenticular swellings of the

leaf blade of *Hydnocarpus wightiana* Bl., visible nearly equally on both sides of the leaf blade ; 4 mm in diameter ; with a conspicuous fleshy but hard, cylindrico-conical and curved hypophyllous, obtuse, horn-like process about 2 mm long and 1.5-2.0 mm thick at base ; on the upper surface with a circular, disc-like operculum which falls off in the mature gall : Gall No. 461 by Cecidomyiid.

FLACOURTIACEAE

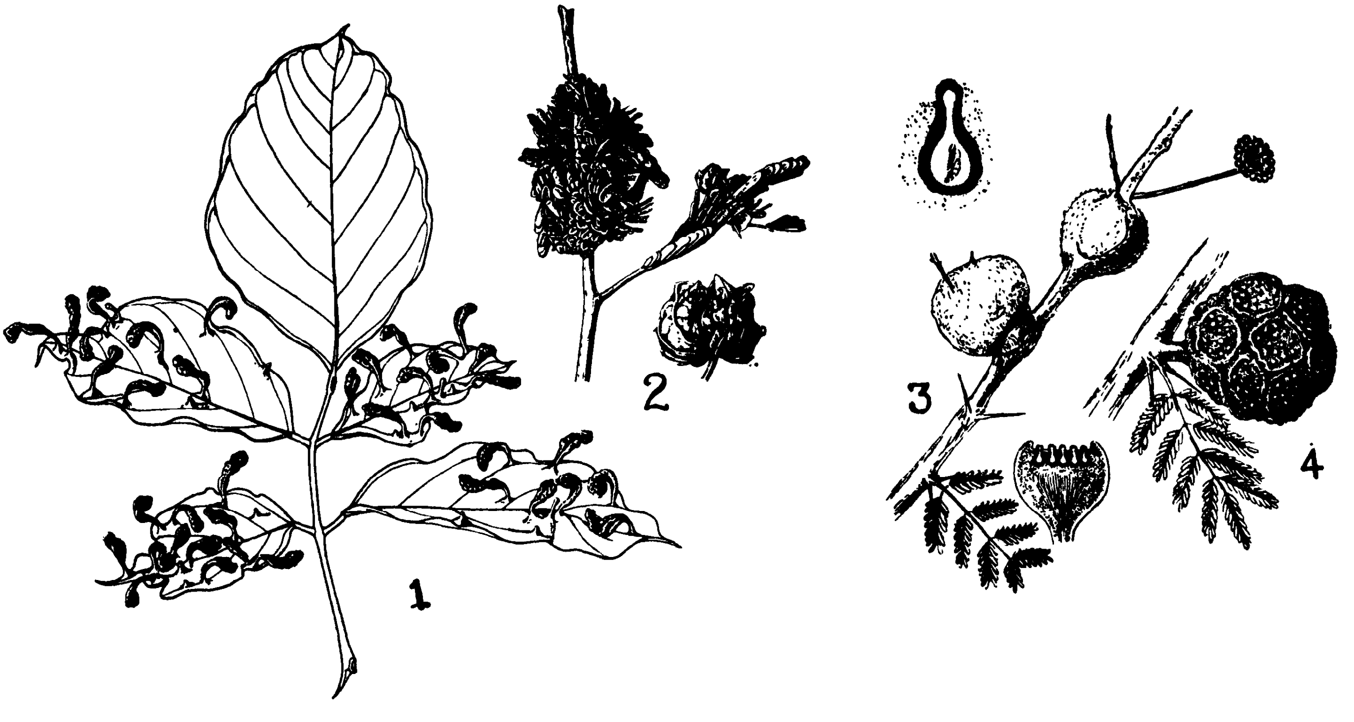
1. Subglobose or oval, unilateral, solid, hard, woody, reddish-brown swelling of the shoot axis of *Flacourtia ramontchi* L'Herit, 20-30 mm long and 5 mm thick : Gall No. 287 by Cecidomyiid.

TAMARISCACEAE

1. Shoot axis gall 2
   Flower gall .. 3
2. Globose, multilocular rindengall on branches of *Tamarix dioica* Roxb., 5-10 mm thick, dark brown when mature : Gall No. 174 by *Misospatha tamaricis* Mani.
   Globose or fusiform, subterminal or internodal, unilocular swellings of the young branches of *Tamarix gallica* Linn., 6-9 mm long and 4-8 mm thick ; partly green and often tinged with violet-red : Gall No. 175 by *Amblardiella tamaricum* Kieff.
3. Subglobose, solid, fleshy or spongy, agglomerated swellings on *Tamarix articulata* Vahl, 20-30 mm thick, brown or grey ; with fleshy tubercles and gummy or sugary exudations ; gall parenchyma with numerous tortuous fleshy galleries and emergences : Gall No. 364 by *Eriophyes* sp.

GUTTIFERAE

1. Shoot axis gall 2
   Leaf gall 3
2. Globose or cortical swellings of branches of *Mesua ferrea* Linn., 4-5 mm thick : Gall No. 123 by *Amorphococcus mesuae* Green.
3. Gall on petiole 5
   Gall on leaf blade 4
4. Epiphyllous, globose or reniform, succulent, multilocular swelling on *Mesua ferrea* Linn., greenish-brown ; 3-50 mm long, 3-50 mm thick ; sometimes extending down to also the midrib and apex of the petiole : Gall No. 371 by Cecidomyiid.



Figs. 1-4

1. Gall No. 17 on *Pongamia glabra* Vent. by *Eriophyes cheriani* Massee.
2. Gall No. 39 on *Acacia leucophloea* Willd. by *Thilakothrips babuli* Ramakr.

3-4. Gall No. 271 on *Acacia leucophloea* Willd. by *Trichilogaster* sp.

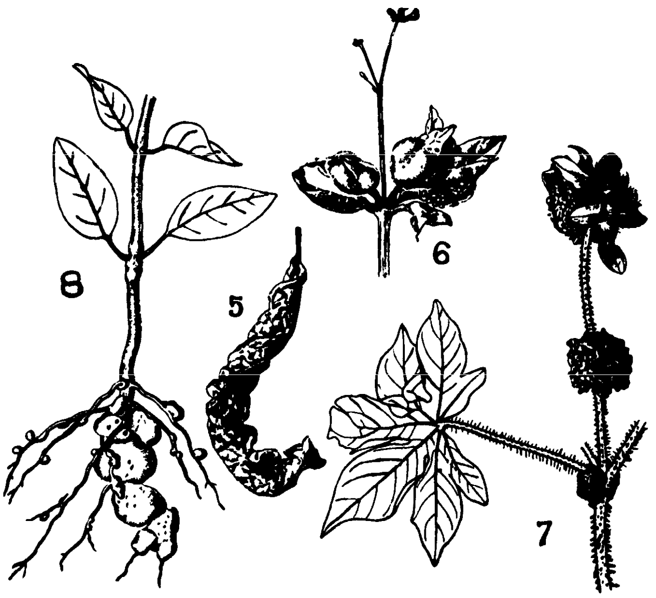
5. Globose, fleshy, hard, brown, unilocular, sometimes agglomerated swellings on *Calophyllum decipiens* Wight ; 10-25 mm long and about 10-17 mm thick : Gall No. 382 by Psyllid.

TERNSTROEMIACEAE

1. Root gall 2
   Gall on aerial parts .. 3
2. Irregular nodose swellings of lateral roots of *Thea chinensis* Linn., confined mostly to the cortex : Gall No. 319 by *Heterodera marioni* Cornu & Goodey.
3. Shoot axis gall .. 4
   Gall not on shoot axis 5
4. Fusiform, diffuse, solid swellings of branches of *Thea chinensis* Linn. : Gall No. 124 by *Chionaspis manni* Green.
5. Bud gall 6
   Leaf gall .. 7
6. Globose, solid swelling of the axillary bud of *Camellia drupifera* Lour., 10 mm in diameter ; surface covered by acute and recurved emergences, representing the tips of leaf rudiments ; larval cavities with sclerenchyma layer : Gall No. 176 by *Lasioptera longispatha* Kieff.
7. Gall on the leaf blade 9
   Gall on the leaf vein .. 8
8. Subglobose, shortly pedicelled, fleshy, bilocular hypophyllous gall on *Eurya japonica* Thunb., 5-8 mm large : Gall No. 568 by Cecidomyiid.
9. Globose, solid, fleshy, unilocular, green, glabrous gall on *Eurya japonica* Thunb. or *Schima wallichii* Chois. or *Echinocarpus dasycarpus* Benth. ; 5-6 mm in diameter : Gall No. 178 by *Lasioptera trilobata* Kieff.
   Subglobose, shortly pedicelled, solid, fleshy, smooth, unilocular gall on *Eurya japonica* Thunb., 8-12 mm high and 6-8 mm thick : Gal No. 177 by *Schizomyia incerta* Kieff.

DIPTEROCARPACEAE

1. Leaf gall 2
   Flower gall 3
2. Epiphyllous, shallow pouch gall on *Shorea robusta* Gaertn. ; ostiole hypophyllous, pit-like depression on the underside ; pale yellow ; 1-1.5 mm in diameter : Gall No. 52 by *Phylloplecta* sp.
3. Globose, hard, woody, multilocular, spiny gall on *Hopea wightiana* Wall., resembling a miniature sea-urchin ; 10-15 mm in diameter : Gall No. 569 by Cecidomyiid.
   Similar to gall No. 569 but on *Hopea parviflora* Bedd. : Gall No. 179 by Cecidomyiid.



Figs. 5-8

5. Gall No. 45 on *Jasminum pubescens*(?) Willd. by *Eothrips aswamukha.*
6. Gall No. 255 on *Boerhaavia diffusa* Linn. by *Punarnavomyia boerhaaviaefoliae* (Mani).
7. Gall No. 25 on *Ipomaea pes-tigridis* Linn. by *Eriophyes* sp.
8. Gall No. 2 on *Ruellia prostrata* Poir. by *Heterodera marioni* Cornu & Goodey.

MALVACEAE

1. Root gall 2
   Gall on aerial parts 3
2. Irregular, globose or fusiform, localized or extensive, solid, fleshy, cortical swellings of the main and lateral roots of *Abelmoschus* (= *Hibiscus*) *esculentus* (Linn.) Moench, of variable size : Gall No. 288 by *Heterodera marioni* Cornu & Goodey.
   Irregular nodosities on roots of *Sida rhombifolia* Linn. : Gall No. 303 by *Heterodera marioni* Cornu & Goodey.
3. Gall on shoot axis 4
   Leaf gall .. 10
4. Shoot axis swollen 6
   Shoot axis not conspicuously swollen 5
5 Filzgall of dense, silky-white and extensive hairy outgrowths of epidermis of *Gossypium herbaceum* : Gall No. 5 by *Eriophyes gossypii* Banks.
6. Hollow swellings of main axis or of branches 7
   Solid swellings on main axis or branches .. 9

7. Gall on cauline part of the shoot axis 8
Gall on tender part of branch ; fusiform, rugose, unilocular swelling of branches of *Sida acuta* Burm., 10-20 mm long and 5 mm thick : Gall No. 187 by Cecidomyiid.

8. Globose, diffuse swellings on *Gossypium* : Gall No. 127 by *Alcidodes* sp.
Globose or oval or fusiform, often extensive nodose swellings on *Gossypium,* with irregular larval cavity : Gall No. 128 by *Pempherulus affinis* (Faust.).

9. Globose, solid, rugosely tuberculated, fleshy, green, pubescent swellings of tender branches of *Hibiscus vitifolius* Linn., about 5 mm in diameter : Gall No. 180 by Cecidomyiid.
Globose, solid, fleshy, somewhat succulent, unilateral rindengall on *Hibiscus vitifolius* Linn., with fleshy tubercles ; 5-25 mm in diameter : Gall No. 452 by fungus.

10. Gall wholly epidermal .. 11
Gall not wholly epidermal ; simple pouch galls or complex covering galls .. 12

11. Hemispherical, deep reddish-brown, blister-like epidermal outgrowths on *Hibiscus solendra* L'Herit., hypophyllous ; 1-2 mm in diameter : Gall No. 342 by *Synchytrium* sp.

12. Low pit-like pouch galls 13
Conspicuous pouch galls with ostiole more or less obliterated 14

13. Rugose, yellow or green gall on *Hibiscus rosa-sinensis* Linn., with fleshy emergences and a few simple hairs in the gall cavity : Gall No. 7 by *Eriophyes hibisci* Nal.
Smooth pale green gall on *Kydia calycina* Roxb. with wide open hypophyllous pit-like ostiole Gall No. 53 by *Pauropsylla* sp.

14. Gall epiphyllous or hypophyllous 15
Gall nearly equally developed on both sides of the leaf blade 16

15. Gall predominantly epiphyllous ; subglobose, pale yellow, rugose, unilocular, on *Hibiscus.*
Gall epiphyllous or also hypophyllous and often also visible more or less on both sides of the blade ; crowded and agglomerated ; over 300 galls on a single leaf of *Althaea rosea* Linn., 3-8 mm in diameter : Gall No. 512 by *Eriophyes* sp.

16. Globose or pyriform, simple or agglomerated, thick-walled, bright yellow galls on *Hibiscus micranthus* Linn., 2-4 mm in diameter ; clothed with stellate hairs ; ostiole minute, on an obscure nipple-like eminence : Gall No. 6 by *Eriophyes hibisci* Nal.
Conical pouch gall on *Eriolaena quinquelocularis* Wight ; apically with tufts of brown hairs ; ostiole elongate : Gall No. 572 by *Eriophyes* sp.

STERCULIACEAE

1. Disc-like pouch gall, developed nearly equally on both sides of the blade of *Melhania futteyporensis* Munro ; ostiole hypophyllous on a short, cylindrical or subconical, chimney-shaped, fleshy prolongation, leading into an atrium ; gall cavity depressed oval space, with sclerenchyma zone ; 4 mm in diameter, 2 mm thick : Gall No. 338 by Cecidomyiid.

TILIACEAE

1. Root gall 2
Leaf gall .. 3

2. Fusiform or subglobose, nodose swellings of lateral roots of *Triumpheta rhomboidea* Jacq. : Gall No. 315 by *Heterodera marioni* Cornu & Goodey.

3. Pouch gall 4
Filzgall, with obscure bulging of the leaf blade on the opposite side on leaf of *Triumpheta rhomboidea* Jacq. : Gall No. 10 by *Eriophyes* sp.

4. Spiny gall ; conspicuously hairy, usually densely clothed with elongate villous hairs .. 5
Gall not spiny, at the most only pubescent but never conspicuously hairy or clothed with long villous hairs 6

5. Hypophyllous, globose or pyriform, unilocular, coriaceous and operculate gall on *Grewia* (*Eugrewia*) *orientalis* Linn., 5 mm in diameter ; epiphyllous ostiole plugged by hairy operculum that is pushed off in mature gall ; galls develop usually close to the larger leaf veins : Gall No. 182 by *Asphondylia* sp.
Irregularly oval, fleshy, densely pubescent swelling of the leaf blade of *Triumpheta rotundifolia* Lamarck, folded upward along the midrib ; 10 mm long, 5 mm thick ; pubescence of long dense stellate hairs : Gall No. 463 by Cecidomyiid.

6. Gall dehiscent 7
Gall indehiscent 8

7. Epiphyllous, globose, verrucose, subsessile, yellow, pubescent, deciduous gall on *Grewia* sp., 8-12 mm in diameter ; with irregular cavity : Gall No. 330 by Psyllid.

8. Gall always epiphyllous 9

Mostly epiphyllous, but often also hypophyllous ; hemispherical or subglobose, nearly solid, sometimes agglomerate ; yellowish-brown ; densely pubescent ; unequally developed on the two sides of the leaf of *Grewia* sp., 5 mm in diameter ; cavity nearly obliterated by irregular fleshy emergences and dense, white, long erineal outgrowth : Gall No. 355 by *Eriophyes* sp.

9. Multilocular, pimple-like, sessile fall on *Grewia microcos* Linn., 4 mm in diameter ; corniculate, hirsute, reddish or reddish-brown when old ; cavity with irregular, fleshy emergences and erineum : Gall No. 9 by *Eriophyes* sp.

Unilocular, shortly but conspicuously pedicelled pouch gall on *Grewia microcos* Linn., abruptly enlarged above the pedicel, compressed and branched apically ; 10-15 mm long and nearly as thick apically ; ostiole hypophyllous ; erineum stellate : Gall No. 413 by *Eriophyes* sp.

ELEOCARPACEAE

1. Hypophyllous, subglobose or hemispherical, rugose or warty gall on *Elaeocarpus serratus* Linn., with wide open ostiole ; 10-20 mm in diameter and 5-8 mm high ; cavity with dense, short, brown erineum of matted hairs : Gall No. 508 by *Eriophyes* sp.

GERANIACEAE

1. Root gall 2

Shoot axis gall 3

2. Fusiform, nodose, solid swellings of the lateral roots of *Impatiens balsamina* Linn. : Gall No. 393 by *Heterodera marioni* Cornu & Goodey.

3. Globose or subfusiform or moniliform, solid, succulent swellings of the tender branches of *Impatiens micranthemum* Edgew., pale green, 15-20 mm thick and 25 mm long ; larval galleries axial, elongate, with sclerenchyma zone, in the medulla of the branch : Gall No. 587 by *Lasioptera* sp.

RUTACEAE

1. Shoot axis gall 2

Leaf or flower gall 3

2. Globose, solid, woody, yellowish-brown, often unilateral rindengall on branches of *Citrus medica acida* Linn., 25-35 mm in diameter : Gall No. 361 by *Sphaeropsis tumefaciens* Hedg.

3. Leaf gall 4

Subglobose, almost solid, fleshy, asymmetrical, unilocular swellings of the flowers of *Todalia aculeata* Pers., nearly as large and of the same colour as a normal fruit, but deeply longitudinally striate ; cavity small : Gall No. 185 by *Asphondylia* sp.

4 Gall on petiole or on midrib, sometimes also on stipule of *Aegle marmelos* Corr. ; diffuse, fusiform tumescence : Gall No. 129 by *Clitea picta* Baly.

Gall on leaf blade .. . 5

5. Fold gall, pouch gall or covering gall 6

Irregular hypophyllous patches of erineum on *evodia roxburghiana* Forst. : Gall No. 529 by *Eriophyes* sp.

6. Pouch gall or covering gall 7

Fold gall ; subglobose or oval, thick-walled, pod-like and utricular swellings of the three tender leaflets of *Aegle marmelos* Corr., dehiscent along the margin of the folded leaflets : Gall No. 183 by *Cecidomyia dattai* Mani.

7. Pouch gall 8

Covering gall ; stout, elongate-cylindrical, fleshy swellings of the veins of *Murraya paniculata* (Linn.) Jack. (= *exotica*) ; 10 mm long, 1-2 mm thick ; equally developed on sides of the blade ; pale yellow ; with a narrow slit-like, elongate ostiole extending the whole length of the gall ; cavity, axial, single : Gall No. 184 by Cecidomyiid.

8. Epiphyllous, hemispherical pouch gall on *Chloroxylon swietenia* DC., ostiole hypophyllous : Gall No. 54 by *Arytaina ramakrishnai* Crawf.

Hypophyllous, irregular green gall on the sides of the midrib of *Glycosmis cochinchinensis* Pierre ; 1-3 mm long and 1-2 mm thick : Gall No. 380 by Cecidomyiid.

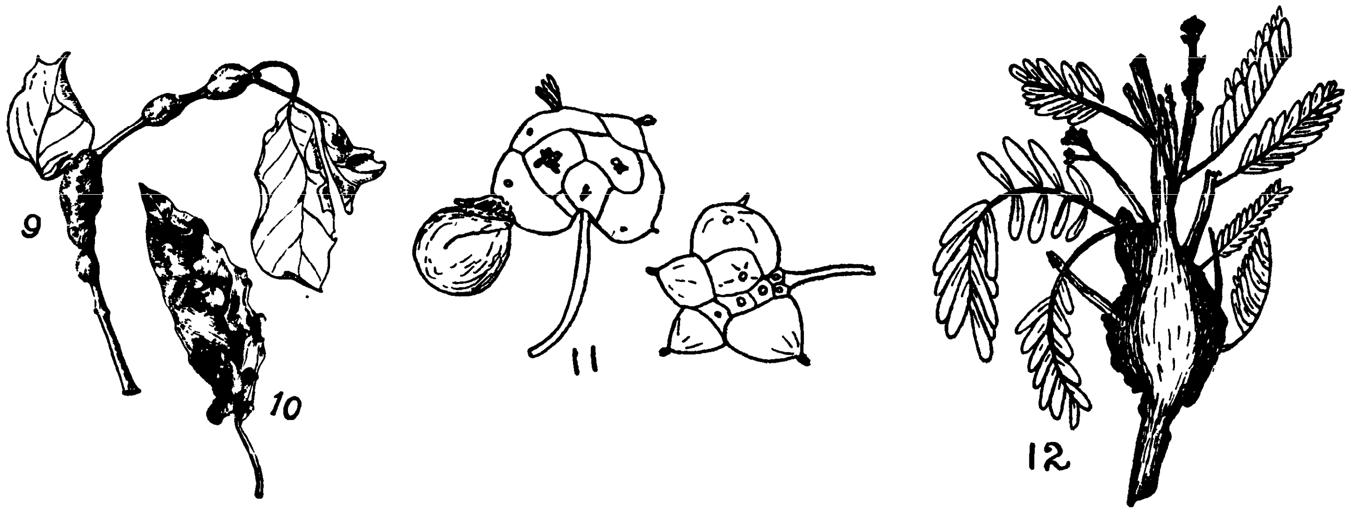
BURSERACEAE

1. Leaf gall 2

Gall on inflorescence axis 3

2. Parenchyma emergence gall on *Commiphora caudata* Engl., whole leaf blade greatly swollen and covered by irregular fleshy emergences : Gall No. 410 by *Eriophyes* sp.

Pouch gall ; epiphyllous, simple or clustered groups of subglobose or subcylindrical, sessile, coriaceous, dehiscent gall inserted in a cup-like swelling of covering growth close to the base of the midrib of *Garuga pinnata* Roxb. ; yellow



Figs. 9-12

9. Gall No. 163 on *Salvadora oleoides* Dine. by *Thomasiniana salvadorae* (Rao).
10. Gall No. 356 on *Salvadora persica* Linn. by *Eriophyes* sp.
11. Gall No. 228 on *Morinda tinctoria* Roxb. by *Asphondylia morindae* Mani.
12. Gall No. 165 on *Emblica officinalis* Gaertn. by *Betousa stylophora* Swinhoe.

or tinged red ; 20 mm long, 10 mm thick ; conspicuously veined and with a mucronate process apically ; cavity specious : Gall No. 55 by *Phacopteron lentiginosum* Buckt.

3. Extensive swelling of the entire inflorescence, with irregular, fleshy, parenchyma emergences on *Commiphora caudata* Engl. : Gall No. 409 by *Eriophyes* sp.

AQUIFOLIACEAE

1. Hypophyllous pouch gall on *Ilex wightiana* Wall., with an epiphyllous shallow yellow pit : Gall No. 56 by Psyllid.

RHAMNACEAE

1. Gall on shoot axis 2
   Gall on bud, leaf or fruit .. 6
2. Parenchyma emergence gall .. 3
   Covering gall or rindengall 4
3. Globose, rugose, hard, reddish-brown swellings on *Zizyphus jujuba* Lamarck, 25-50 mm in diameter ; with naked parenchyma cells ; persisting dry for long periods on branch : Gall No. 11 by *Eriophyes cernuus* Massee.
4. Rindengall ; solid, indehiscent swellings of tender branches of *Rhamnus virgatus* Roxb., 15-20 mm long, 5-8 mm thick, with hypertrophy of cortex : Gall No. 491 by *Ascomycete* fungus.
   Covering gall 5
5. Subglobose, pale yellow to greenish-yellow, solitary or agglomerate emergences on *Rhamnus virgatus* Roxb., 3-4 mm in diameter ; developed from subepidermal cortex ; ostiole minute, on the summit ; finely pubescent ; cavity with fleshy emergences and sparsely with long, simple trichome : Gall No. 437 by *Eriophyes* sp.
   Subglobose or pyriform or nearly conical, unilocular, indehiscent, yellowish-green, glabrous or densely pubescent gall on *Zizyphus jujuba* Lamarck ; 3-4 mm long, nearly as thick ; ostiole on summit of a conspicuously beaked, curved, nipple-like blunt process ; gall epidermal and subepidermal in development : Gall No. 186 by Cecidomyiid.
6. Gall on vegetative bud or leaf 7
   Covering gall on fruit of *Zizyphus xylopyrus* Willd., similar to gall No. 186, but 4-5 mm large, yellow to brown : Gall No. 187 by Cecidomyiid.
7. Leaf gall 8
   Bud gall on *Sageretia oppositifolia* Brongn., rosette gall, 20-30 mm in diameter ; leaf rudiments modified into palmately lobed, reduced, greenish-yellow outgrowths ; cavities numerous, at base of these outgrowths : Gall No. 441 by Cecidomyiid.
8. Gall equally developed on both sides of the leaf blade 9
   Gall unequally developed on the two sides .. 10
9. Globose, unilocular, deep reddish to rusty-brown,

on *Zizyphus* sp., 1-2 mm in diameter : Gall No. 300 by Cecidomyiid.

10. Subglobose or pyriform, sometimes conical, unilocular, indehiscent, yellowish-green gall on *Zizyphus jujuba* Lamarck ; 3-4 mm ; ostiole on summit of a curved, beak-like or nipple-like, blunt, subconical process : Gall No. 186 by Cecidomyiid.

Pouch gall on *Rhamnus virgatus* Roxb., epiphyllous portion subglobose or hemispherical ; hypophyllous part obtusely conical, 1 mm high and 0.75 mm thick ; ostiole hypophyllous ; yellow to greenish-yellow : Gall No. 437 by *Eriophyes* sp.

VITACEAE

1. Acarocecidia 2

Midge gall 3

2. Epiphyllous, elongate-clavate, cylindrical, lopsided pouch gall on *Vitis semicordata* Wall., curved like a hook, narrow basally ; ostiole hypophyllous ; cavity spacious, with dense erineum ; 8 mm long and 2-3 mm thick : Gall No. 432 by *Eriophyes* sp.

3. Gall on shoot axis or bud 4

Gall on leaf 5

4. Moniliform or agglomerate, brownish-green or reddish-brown swellings of tender branches of *Leea* sp., 4-23 mm long and 3-14 mm thick : Gall No. 373 by Cecidomyiid.

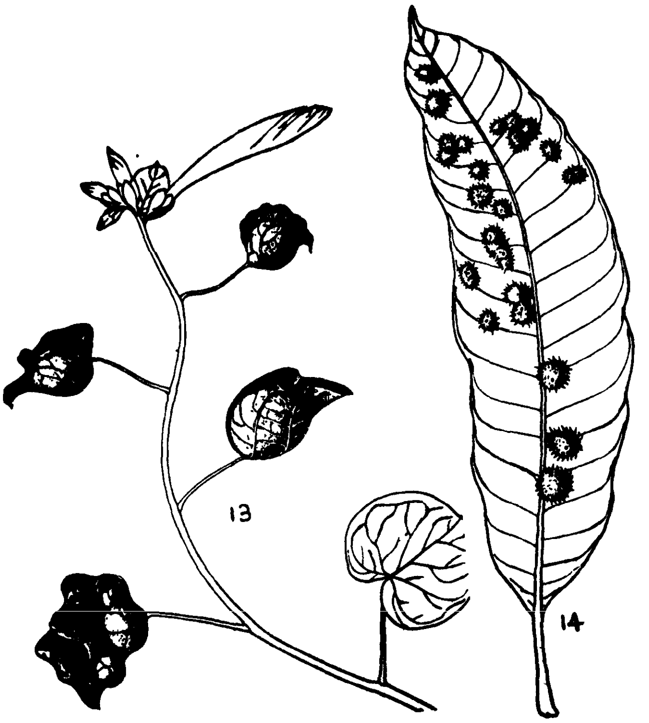
Pyriform or subglobose, solid, multilocular, brown, glabrous, indehiscent swellings of buds and branches of *Vitis semicordata* Wall., 20-30 mm in diameter : Gall No. 432 by Cecidomyiid.

5. Gall on midrib, petiole ; irregular, succulent, solid, reddish-brown swellings on *Leea* sp. : Gall No. 373 by Cecidomyiid.

Pouch gall 6

Hypophyllous, subglobose, unilocular, thick-walled, fleshy but hard gall, mostly on midrib and about the size of a black pepper-corn on *Cayratis pedata* (Vahl) Gagnep. : Gall No. 574 by Cecidomyiid.

Pyriform or bluntly conical gall on *Leea indica* (Burm.) Merr. (= *sambucina* Willd.), visible on both sides of the leaf blade, but the hypophyllous portion larger than the epiphyllous ; the epiphyllous portion a truncated conical solid projection ; uni- or bilocular, hard, 7-8 mm high, 4-5 mm thick : Gall No. 583 by Cecidomyiid.



Figs. 13-14

13. Gall No. 247 on *Rivea hypocrateriformis* Choisy by *Asphondylia riveae* Mani.

14. Gall No. 196 on *Mangifera indica* Mani by *Amradiplosis echinogalliperda* Mani.

SAPINDACEAE

1. Acarocecidia 2

Dipterocecidia 4

2. Filzgall covering the whole or of irregularly large patches of the leaf of *Nephelium lit-chi* Camb. : Gall No. 12 by *Eriophyes chinensis* O'Gara.

Pouch gall 3

3. Epiphyllous, yellowish-green pouch gall on *Aesculus indica* Coleb., 22 mm long, 10 mm wide and 5-8 mm high ; ostiole hypophyllous and wide open ; cavity with numerous erineum-clothed pits, corresponding to obscure tuberosities on the outer surface of the gall : Gall No. 504 by *Eriophyes* sp.

Globose, pubescent or tomentose, pale green, often agglomerated pouch galls on *Sapindus laurifolia* Vahl, 5 mm in diameter, cavity large, filled with brown erineum ; ostiole hypophyllous and plugged by erineum ; often 300-400 galls on a single leaf : Gall No. 13 by *Eriophyes* sp.

4. Leaf gall 5

Gall on growing point of branch or on flower 6

5. Subglobose or conical, thick-walled, bilocular, tomentose, brown, indehiscent pouch gall on *Schleichera trijuga* Willd., developed nearly equally on both sides of the leaf blade, 3 mm in diameter ; tomentum more conspicuous on the lower side of the blade than on the upper ; an incomplete septum divides the cavity into an epiphyllous and hypophyllous part : Gall No. 524 by Cecidomyiid.

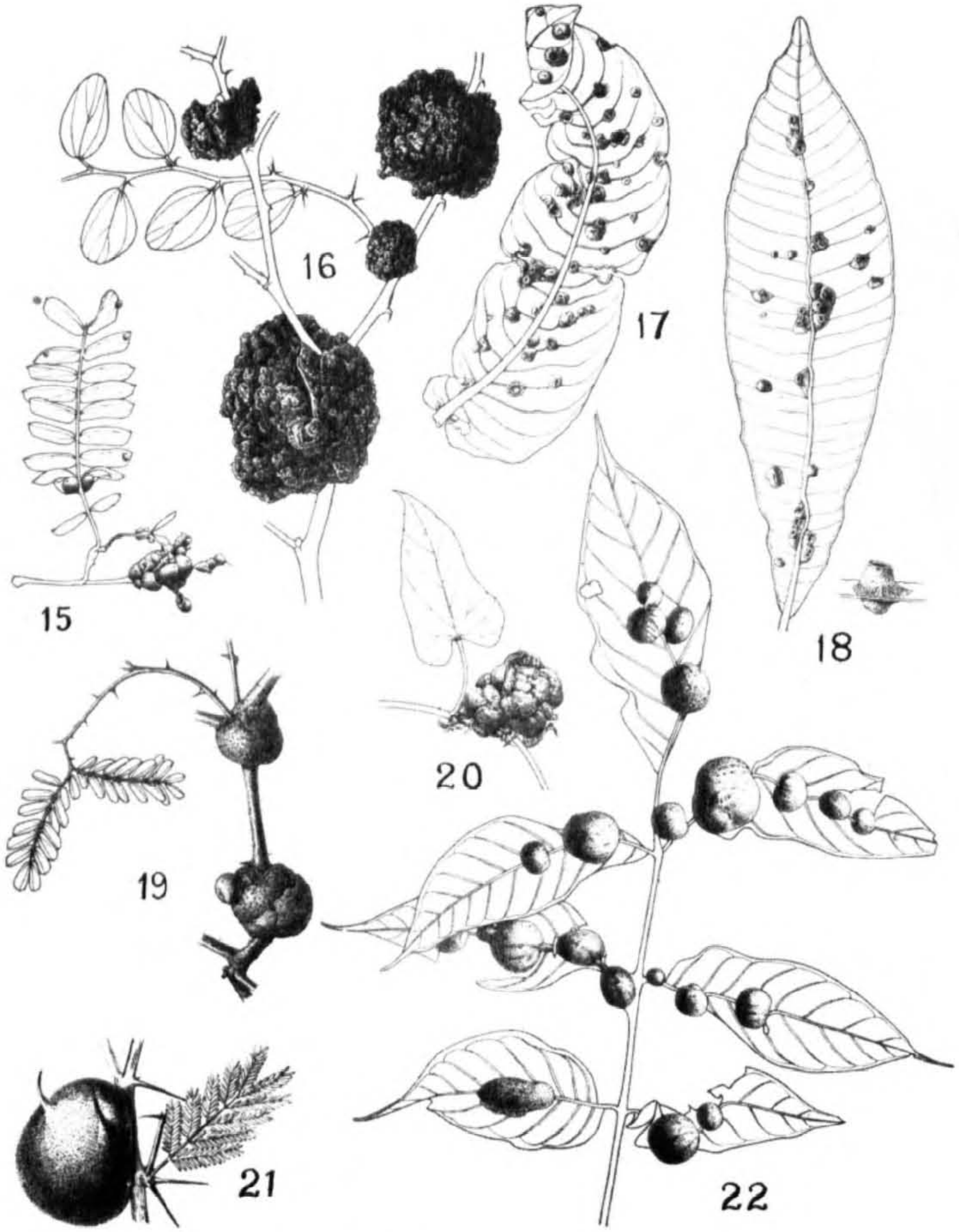
6. Acrocecidium on *Cardiospermum halicacabum* Linn., subglobose, solid, lobed, indehiscent, suppressed and leaves crowded together ; larval galleries elongate, axial, sinuate and filled with callus : Gall No. 166 by Agromyzid.
   Flower gall on *Cardiospermum halicacabum* Linn., subglobose, solid, lobed, indehiscent, greenish-yellow, finely pubescent, spongy, basally confluent with the enlarged membranous calyx that also partly encloses the gall ; 5-8 mm thick : Gall No. 188 by Cecidomyiid.

SABIACEAE

1. Rindengall on the shoot axis of *Sabia campanulata* Wall., globose, sessile, indehiscent, fleshy, green, glabrous, 5 mm large ; crowded in very large numbers giving the slender climber the superficial appearance of a gigantic spike of pepper corns : Gall No. 500 by *Acroaectasis campanulata* Mani.
   Subglobose, fusiform swellings of midrib and larger side veins of *Meliosma rigida* Sieb. & Zucc., 5 mm thick : Gall No. 485 by Cecidomyiid.

ANACARDIACEAE

1. Gall on *Mangifera indica* Linn. 2
   Gall on other species of plants .. 14
2. Gall by Homoptera (Psyllidae) 13
   Gall by Diptera (Itonididae = Cecidomyiidae) .. 3
3. Gall on shoot axis .. 4
   Gall on leaf or flower .. 5
4. Fusiform, unilateral rindengall : Gall No. 189 by *Oligotrophus mangiferae* Kieff.
   Irregular extensive rindengall : Gall No. 197 by. *Rhabdophaga mangiferae* Mani.
5. Gall on leaf 6
   Gall on flower : Gall No. 195 by *Dasyneura mangiferae* Felt.
6. Gall visible on both sides of the leaf blade 7
   Gall epiphyllous or hypophyllous, not equally visible on the two sides of the leaf blade 8
7. Depressed, circular, discoid swellings, 1 mm wide : Gall No. 192 by *Procontarinia matteiana* Kieff. & Cecc.
   Biconvex pustule-like swellings smaller than gall No. 192 : Gall No. 194 by Cecidomyiid.
8. Obtuse-conical or subcylindrical, usually epiphyllous : Gall No. 191 by Cecidomyiid.
   Hemispherical, epiphyllous green : Gall No. 406 by Cecidomyiid.
   Globose or pill-shaped galls .. 9
9. Epiphyllous, spherical, red, spiny galls, with fleshy emergences, resembling a miniature sea-urchin ; 5-7 mm in diameter ; larval cavities 1-2 : Gall No. 196 by *Amradiplosis echinogalliperda* Mani.
   Gall never spiny and never with emergences 10
10. Epiphyllous, sometimes hypophyllous ; spherical or oval ; slate-coloured or very dark brown ; unilocular ; indehiscent ; surface reticulate when old ; 2.5-3.0 mm in diameter ; larval cavity with sclerenchyma zone : Gall No. 190 by *Allosomyia tenuispatha* (Kieff.).
    Spherical gall not exceeding 2 mm in diameter 11
11. Small, epiphyllous, globose, solid, sessile, unilocular, green, 1 mm in diameter : Gall No. 324 by *Amradiplosis viridigallicola* (Rao).
    Small, epiphyllous, globose, solid, sessile, unilocular, hardly 1 mm in diameter : Gall No. 332 by *Amradiplosis keshopurensis* (Rao).
    Medium-sized gall, not green when mature .. 12
12. Epiphyllous, spherical, solid, slaty-grey : Gall No. 325 by *Amradiplosis amraemyia* (Rao).
    Epiphyllous, spherical, solid, brown ; 1.5-2 mm in diameter, with a circular, shiny, brown cap-like operculum on the summit : Gall No. 326 by *Amradiplosis brunneigallicola* (Rao).
13. Fir-cone-like rosette gall on the terminal bud, with persistent, imbricating, coriaceous scales, green when young and brown when old ; 20 mm long, 15 mm thick : Gall No. 57 by *Apsylla cistella* (Buckt.).
14. Gall on petiole and midrib or larger veins .. 15
    Gall on leaf blade .. 16
15. Globose or subfusiform, sometimes extensive and moniliform, yellowish-brown, glabrous, solid, fleshy, indehiscent swellings ; 10-20 mm in diameter ; larval cavity L-shaped, with sclerenchyma zone ; on *Lannea* (= *Odina*) *coromandelica* (Houtt.) Merr. (= *wodier* Roxb.) : Gall No. 198 by *Odinadiplosis odinae* Mani.



Figs. 15-22

15. Gall No. 18 on *Prosopis juliflora* Linn. by *Eriophyes prospidis* Saksena.
16. Gall No. 11 on *Zizyphus jujuba* Lamarck by *Eriophyes cernuus* Massee.
17. Gall No. 61 on *Terminalia catappa* Linn. by *Phylloplecta hirsuta* (Crawf.).
18. Gall No. 73 on *Alstonia scholaris* R. Br. by *Pauropsylla tuberculata* Crawf.
19. Gall No. 274 on *Prosopis juliflora* Linn. by Chalcid.
20. Gall No. 25 on *Ipomaea scindica* Stocks. by *Eriophyes* sp.
21. Gall No. 208 on *Acacia leucophloea* Willd. by Cecidomyiid.
22. Gall No. 198 on *Lannea coromandelica* (Houtt.) Merr. by *Odinadiplosis odinae* Mani.

16. Leaf roll gall 17
    Pouch gall, covering gall or other complex types of galls 18

17 Simple leaf roll gall on *Spondias mangifera* Willd. Gall No. 58 by *Pauropsylla spondiasae* Crawf.
    Elongate, pod-shaped, straight or twisted, hollow, coriaceous, green or pinkish ; hard and dehiscent when mature ; 130-400 mm long, 25 mm thick ; apically imperforate ; on *Pistacia integerrima* Stew: Gall No. 105 by *Dasia aedifactor* (Buckt.).
    Irregular, compressed, pod-shaped, fleshy ; 10-30 mm long, 10-15 mm wide, 4-5 mm thick ; often with 2-4 appendages ; on *Pistacia khinjuk* Stocks : Gall No. 106 by Aphid.

18. Pouch gall 19
    Solid or nearly solid, pellet-like galls 20

19. Epiphyllous, globose, hemispherical, often agglomerate, fleshy, yellow ; ostiole hypophyllous, 2-3 mm in diameter ; with scattered erect, short, or recurved trichomes ; erineum white, simple unbranched ; over 200 galls develop on each leaflet of *Rhus semialata* Linn. : Gall No. 447 by *Eriophyes* sp.
    Hypophyllous, hemispherical, thick-walled, unilocular, hard, dehiscent, glabrous, reddish-brown ; 5 mm in diameter ; on *Semecarpus anacardium* Linn. : Gall No. 573 by Psyllid.

20. Hypophyllous, subglobose or oblate, sessile, solid, indehiscent, rugose, dark brown galls on *Holigarna arnottiana* Hook. f. 7 mm in diameter : Gall No. 388 by Cecidomyiid.

LEGUMINOSAE

1. Galls on *Acacia* spp. .. 2
    Galls on plants of other genera 24

2. Shoot axis gall 3
    Gall not on shoot axis . 8

3. Gall a simple hollow swelling of the branch 4
    Gall solid or other complex swelling and outgrowth on branch 5

4. Mostly oval or fusiform, hard, woody, unilocular, indehiscent swellings of branches of *Acacia leucophloea* Willd., 20-35 mm long, 15 mm thick : Gall No. 131 by *Sphadosmus brahminus* Pas.

5. Acrocecidia .. 6
    Gall not on the growing tip of the shoot axis 7

6. Subglobose or turbiniform, solid, hard, woody, indehiscent swellings on *A. leucophloea* Willd., often agglomerate of 7-15 galls ; 75-80 mm thick ; each gall with flattened, circular shallow cup-shaped, depressed area on the summit, containing numerous exit holes or the larval cells covered by hemispherical loose lids ; in the agglomerate galls the cup-shaped depressions give a facctted appearance : Gall No. 271 by *Trichilogaster* sp.

7. Irregularly globose, solid, woody, indehiscent, persistent, reddish-brown swellings, often 100-150 mm in diameter ; on *A. leucophloea* Willd. : Gall No. 360 by *Uromycladium* (*notable* ?).
    Subglobose, localized and unilateral, dirty-white or pale yellow, rugose, fleshy but moderately hard, indehiscent and persistent ; 50 mm in diameter ; on *Acacia* sp. : Gall No. 404 by fungus.

8. Gall on vegetative buds or leaves 9
    Gall on flower or fruit .. 21

9. Bud gall 10
    Leaf gall . 11

10. Rosette gall superficially resembling a miniature cabbage, 25-30 mm in diameter ; with the rudiments of the leaflets enlarged, crumpled and

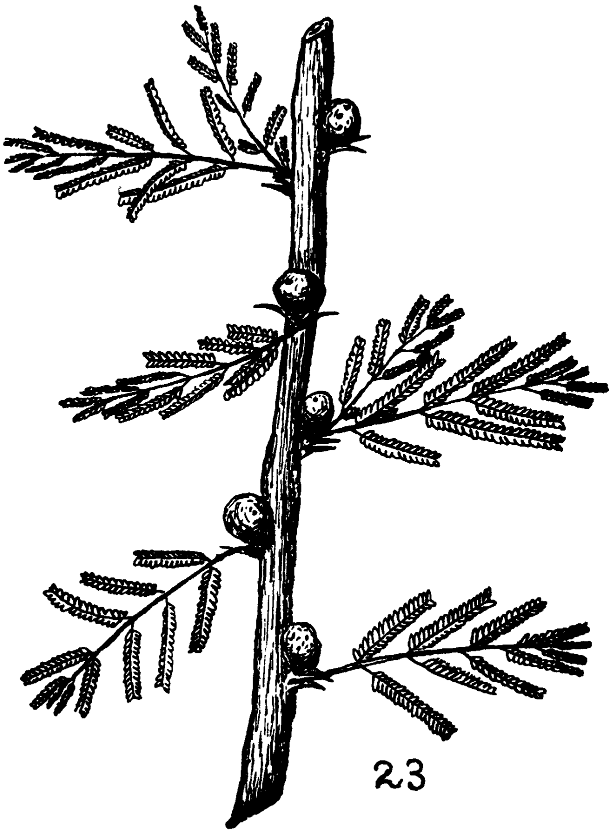


Fig. 23. Gall No. 273 on *Acacia leucophloea* Willd. by Chalcid.

rolled ; coriaceously thickened ; on *A. leucophloea* Willd. : Gall No. 39 by *Thilakothrips babuli* Ramakr.

Globose, smooth, slaty-grey, multilocular, pellet-like swellings of axillary buds, 8 mm in diameter ; on *A. leucophloea* Willd. : Gall No. 273 by Cynipid or Chalcid (?).

11. Gall on stipules ; subglobose, fleshy, solid, parenchyma swellings on *A. leucophloea* Willd., situated at the bases of the paired stipular thorns ; 5-12 mm in diameter ; finely pubescent ; greenish-brown : Gall No. 208 by Cecidomyiid.

Gall on rachis or on leaflets 12

12. Fusiform, solid swellings of the primary rachis of *A. leucophloea* Willd., 10 mm long, 4 mm thick, with numerous tubular outgrowths spreading apically : Gall No. 365 by fungus.

Gall on leaflets .. 13

13. Acarocecidia .. 14

Dipterocecidia 15

14. Subglobose or hemispherical, utricular, thick-walled covering gall on *A. leucophloea* Willd., formed by foliaceous outgrowths from the secondary rachis and the swollen bases of, at least two of serially opposing pairs of leaflets with a narrow cross-shaped slit-like ostiole on the summit ; yellow, yellowish-brown or also violet coloured ; finely pubescent ; 2-3 mm in diameter : Gall No. 14 by *Eriophyes acaciae* Nalepa.

Subglobose or irregular and extensive and densely pubescent, hollow galls on *A. leucophloea* Willd., composed of the greatly enlarged swollen leaflets in series on the upper side of the rachis, which also shows epinasty in consequence and may be slightly intumescent : Gall No. 582 by *Eriophyes* sp.

15. Hollow covering all .. . 16

Solid and complex galls 17

16. Bivalvate gall on *A. catechu* Willd. ; globose, 3-3.5 mm in diameter ; composed of one large bowl-shaped and another shallow cup-shaped valves, fitting each other by their broad rims to enclose a spacious gall cavity ; the valves arise from the bases of leaflets, the apices remaining normal and flat as wing-like processes on the gall ; dark reddish-brown or violet : Gall No. 209 by *Lobopteromyia bivalviae* (Rao).

17. Gall conspicuously hairy .. 18

Gall glabrous, not conspicuously hairy .. 19

18. Pubescent gall on *A. leucophloea* Willd., subglobose, solid, sessile, fleshy, yellowish-green or yellowish-brown, fused swellings of the basal parts of two adjacent leaflets on the same side of the secondary rachis ; with paired fleshy carinae externally base upward passing into thin normal apices of the leaflets ; 4-5 mm in diameter ; larval cavities usually paired : Gall No. 204 by *Schizomyia* sp.

Densely hairy gall on *A. leucophloea* Willd., pyriform, brown, hard, solid, 3 mm in diameter ; formed by the enormously swollen and fused pairs of adjacent leaflets of the same side of the pinna ; larval cavity 1-2 : Gall No. 206 by *Asphondylia trichocecidarum* Mani.

Tomentose gall on *A. leucophloea* Willd., globose or pyriform or also shortly cylindrical or hour-glass-shaped, externally bilaterally symmetrically bilobed ; solid, fleshy but hard ; yellow or reddish-brown ; 8 mm long and 5-6 mm thick ; formed by the fusion of the swollen bases of two leaflets of the pinna : Gall No. 207 by *Schizomyia acaciae* Mani.

19. Simple pod-shaped or lomentum-like gall on *A. leucophloea* Willd., formed by two fused and swollen adjacent leaflets of the same side of the pinna ; green, glabrous ; 2-2.5 mm long, 1 mm thick ; larval cavities spherical, 1-2 : Gall No. 203 by Cecidomyiid.

Complex barrel-shaped or cylinder-piston galls 20

20. Barrel-shaped, stout, hollow, thick-walled outgrowths from the upper surface of one leaflet, into which fits tightly a short, stout, stumpy-cylindrical and pestle-like plug growing out from the under surface of the next leaflet above on the pinna of *A. suma* Ham.-Buch., unilocular, hard, dehiscent, brown, rugose, 3.5-4.0 mm long, 2.5 mm thick ; the barrel of the gall with a short, cylindrical or conical fleshy, horn-like processes on the side opposite to the plug : Gall No. 456 by *Lobopteromyia ramachandrani* Mani.

Cylinder-piston gall on leaflets of *A. suma* Ham.-Buch., hypophyllous, sessile, elongate-cylindrical slender, solid, yellowish-green or reddish-brown or also violet coloured smooth ; each gall consists of a hollow cylindrical hypophyllous outpocketing from one leaflet, into which fits a solid, cylindrical, piston-like parenchymatous, hypophyllous outgrowth from the leaflet above ; the larval cavity cylindrical, above the solid piston, in the narrow tip of the gall : Gall No. 453 by *Lobopteromyia* sp.

21. Flower gall 22

Fruit gall .. 23

22. Globose, fleshy, hollow, often lobed, bud-like swellings of the flowers of *A. leucophloea* Willd. : Gall No. 38 by *Thilakothrips babuli* Ramakr.

Globose, solid, hard, woody galls on *A. leucophloea* Willd., 8 mm in diameter ; 3-4 larval cells : Gall No. 272 by Chalcid.

23. Irregular, multilocular, indehiscent, rugose swellings of the fruits of *A. concinna* DC., about 30-45 mm thick. Gall No. 270 by Chalcid.

Irregularly large, solid swellings of the fruits of *A. leucophloea* Willd., often 50 mm large : Gall No. 273 by *Uromycladium.*

24. Gall on *Crotolaria* spp. 25

Gall on *Indigofera* spp. .. 28

Gall on plants of other genera 42

25. Gall a hollow swelling of the shoot axis .. 26

Gall a solid swelling of the shoot axis 27

26. Oval or pyriform, green, villous, thick-walled, terminal or subterminal swellings on *C. willdenoviana* DC. : Gall No. 158 by Lepidoptera.

Subglobose or mostly fusiform, smooth, green swellings of branches of *C. saltiana* Andr., 10-15 mm long, 3-5 mm thick ; larval cavity axial : Gall No. 155 by *Grapholitha subrufillana* Snel.

Fusiform, hard, unilocular swellings of the branch of *C. juncea* Linn., about 25-30 mm long : Gall No. 153 by *Laspeyresia pseudonectis.* Meyerick.

Same as the foregoing, but much larger swellings on *C. juncea* Linn. : Gall No. 154 by *Laspeyresia tricentra* Meyerick.

Diffuse, subglobose or generally fusiform, terminal or subterminal swellings on *C. semperflorens* Vent. : Gall No. 156 by Lepidoptera.

Fusiform and angulated swellings of the branch of *C. verrucosa* Linn., 15 mm long and 8 mm thick : Gall No. 157 by Lepidoptera.

27. Globose, solid, tuberculated, rindengall on *C. saltiana* Andr., 25 mm thick : Gall No. 662 by Cecidomyiid.

28. Gall on shoot axis .. 29

Gall not on shoot axis 32

29. Gall a swelling of the branch .. 30

Gall wholly a subepidermal rindengall, erupting through the epidermis when mature 31

30. Hollow, indehiscent swellings of the tender branch of *Indigofera linifolia* Retz. : Gall No. 669 by *Anataractis plumigera.*

Globose, unilocular, sessile, usually 2-3 agglomerate, thin-walled swellings on *I. dosua* Ham., 6-7 mm in diameter : Gall No. 483 by *Oxasphondylia dosua* Mani.

31. Erupting rindengall not hairy ; oval or subpyriform, smooth, unilocular, 5 mm long, 3 mm thick ; large numbers of galls develop close together under the epidermis, which eventually cracks open and exposes the galls ; lengths of branch often 150-200 mm, bear such galls show initially diffuse unilateral swellings ; on *I. dosua* Ham. : Gall No. 484 by Cecidomyiid.

Erupting rindengall hairy ; subglobose, densely deep reddish or rusty hair-like, fleshy, simple, multicellular emergences from a central core of spongy mass, enclosing 1-2 larval cavities ; the hairy outgrowths develop wholly from the cortex and the epidermis peels off, exposing the fluffy outgrowth ; on *I. pulchella* Roxb. : Gall No. 457 by Cecidomyiid.

32. Gall on bud and the growing tip 33

Gall on leaf, inflorescence axis or flower 35

33. Gall echinate ; fleshy, 2-3 agglomerate galls of axillary buds of *I. gerardiana* Wall. ; 15-20 mm thick, green, cottony-white, with elongate, slender, fleshy, leafy or spiny outgrowths ; cavity large : Gall No. 486 by *Oxasphondylia echinata* Mani.

Gall not echinate .. 34

34. Gall globose or nearly so ; solid, hard, woody or fleshy, brown, smooth or tubercular swellings of the axillary buds of *I. dosua* Ham., 5-7 mm in diameter, with numerous larval cells : Gall No. 430 by Cecidomyiid.

Gall of variable shape ; subglobose, pyriform or lobed, solid, hard, woody, green, indehiscent swellings of terminal or axillary buds of *I. pulchella* Roxb., with silvery-white pubescence and stunted vestiges of leaf rudiments, 20-25 mm thick : Gall No. 513 by Cecidomyiid.

Irregularly globose or pyriform, hard, woody or fleshy, brown swellings of the axillary buds of *I. pulchella* Roxb., somewhat like gall No. 430 : Gall No. 517 by Cecidomyiid.

35. Gall on leaf 36

Gall on inflorescence and single flowers .. 40

36. Gall on rachis .. . 37

Gall on the blade 38

37. Globose, hollow, thin-walled, green or pink-red

swellings on *I. dosua* Ham., 5-7 mm in diameter : Gall No. 429 by Cecidomyiid.

Similar to the foregoing but 6-10 mm in diameter ; on *I. gerardiana* Wall. : Gall No. 503 by Cecidomyiid.

38. Leaf roll gall ; epiphyllous, elongate, pod-like rolling of the margin of the leaflet towards the midrib, densely clothed with silvery-white hairs both inside and on the outside ; on *I. enneaphylla* Linn. : Gall No. 337 by *Eriophyes trichocnemum* Nalepa.

Epiphyllous pouch gall .. 39

39. Subglobose and usually agglomerate, finely pubescent, reddish-brown, 1-2 mm in diameter ; on *I. dosua* Ham. : Gall No. 431 by *Eriophyes indigoferae* Nalepa.

Similar to the foregoing but on *I. gerardiana* Wall. : Gall No. 494 by *Eriophyes indigoferae* Nalepa.

40. Gall on inflorescence axis ; elongate-oval or fusiform, hollow, thin-walled swelling on *I. gerardiana* Wall., 8 mm long, 4 mm thick ; clothed with slender, elongate, needle-shaped fleshy, yellowish-green outgrowth : Gall No. 487 by Cecidomyiid.

Gall on single flower .. 41

41. Cordate or subglobose, solid, fleshy, red or yellowish-green or white swelling of the whole flower of *I. gerardiana* Wall., 10-12 mm in diameter : Gall No. 490 by *Oxasphondylia floricola* Mani.

Sausage-shaped, utricular gall of the ovary of *I. aspalathoides* Vahl : Gall No. 200 by Cecidomyiid.

42. Gall on *Tephrosia* spp.

Gall on plants of other genera .. 47

43. Epiphyllous, hemispherical, thin-walled, pouch gall on *Tephrosia purpurea* Pers., with wide open ostiole below : Gall No. 102 by *Aleuromarginatus tephrosiae* Corb.

Gall on the growing tip or on flower 44

44. Gall on the growing tip of shoot 45

Gall on flower .. 46

45. Pyriform, fusiform or flask-shaped, hollow, green, glabrous or pubescent, hard, thick-walled swellings on *T purpurea* Pers., 20 mm long, 8 mm thick ; exit hole on an obscure subglobose summit ; occasionally with stunted vestiges of leaves : Gall No. 160 by *Dactylethra candida* Staint.

Similar to the foregoing, but somewhat smaller and villous ; on *T hirta* Ham. : Gall No. 161 by Lepidoptera.

Similar but smaller and on *T. spinosa* Pers. : Gall No. 162 by Lepidoptera.

46. Flower bud gall on *T candida* DC. ; with the corolla crumpled and moderately swollen : Gall No. 670 by *Stictodiplosis tephrosiae* Mani.

Pyriform, inflated, utricular, coriaceous, pale green swelling of the ovary of *T candida* DC. ; 8 mm long, 4 mm thick : Gall No. 301 by *Asphondylia tephrosiae* Mani.

47. Gall on *Medicago, Phaseolus, Dolichos* or *Cyamopsis* . 48

Gall on plants of other genera 53

48. Spherical and fusiform swellings of roots of *Medicago sativa* Linn. : Gall No. 340 by *Heterodera marioni* Cornu & Goodey.

Gall on aerial parts .. 49

49. Gall a swelling of branch 50

Flower gall 52

50. Irregular nodular swelling on *Phaseolus radiatus* Linn. : Gall No. 665 by *Alcidodes collaris* Pasc.

Fusiform swelling on *Phaseolus* spp., 5-7 mm long, 1-2 mm thick, with tortuous axial larval cavity : Gall No. 386 by Agromyzid.

Irregular nodular swelling on *Cyamopsis tetragonoloba* Tamb. : Gall No. 667 by *Alcidodes bubo* (Fabr.).

Gall on branch of *Dolichos lablab* Linn. . 51

51. Fusiform, sometimes unilateral, solid, hard, longitudinally striated, green swelling ; 25-30 mm long, 10 mm thick ; with irregular axial larval cavity : Gall No. 134 by *Sagra nigrita* Oliv.

Irregular tumescence of auline part of the branch : Gall No. 135 by *Alcidodes collaris* Pasc.

Subglobose or globose, hard, multilocular swellings, about the size of a 'human fist" : Gall No. 136 by *Desmidophorus* sp.

52. Irregular oval or fusiform or solid, fleshy, deciduous, indehiscent, smooth, green swelling of the ovary of *Cyamopsis tetragona* Tamb., 10 mm long and 4 mm thick : Gall No. 350 by *Asphondylia* sp.

53. Root gall .. 54

Gall on aerial part . . 55

54. Subglobose swellings on root of *Cassia mimosoides* Linn. : Gall No. 390 by *Heterodera marioni* Cornu & Goodey.

Irregular fusiform swellings on roots of *Desmodium* sp. : Gall No. 341 by *Heterodera marioni* Cornu & Goodey.

55. Gall on shoot axis 56

Gall on leaf .. 66

Gall on flower .. 71

56. Coleopterocecidia or Lepidopterocecidia 57

Dipterocecidia or Hymenopterocecidia 62

57. Coleopterocecidia 58

Lepidopterocecidia .. 61

58. Irregular, fusiform, moniliform and sometimes unilateral, solid, hard, woody swelling of variable size, near the ground level on the shoot axis of *Sesbania aegyptiaca* Pers. : Gall No. 137 by *Alcidodes bubo* (Fabr.).

Similar to the foregoing but also moniliform, rugose swelling on the shoot axis of *Sesbania aculeata* Poir. : Gall No. 139 by *Alcidodes bubo* (Fabr.).

Same as the preceding but on *Sesbania grandiflora* Pers. : Gall No. 138 by *Alcidodes bubo* (Fabr.).

Irregular, semi-solid, nodular swelling of the branch of *Cajanus cajan* : Gall No. 666 by *Alcidodes collaris* Pasc.

Gall not as described above 59

59. Diffuse, semi-solid swelling of the tender branch of *Alysicarpus monilifer* DC. : Gall No. 132 by Curculionid.

Localized and pronounced swellings .. 60

60. Fusiform, somewhat compressed, thick-walled, often moniliform ; yellowish-green, brown or violet tinted swellings of tender branch of *Alhagi camelorum* Fisch., 10 mm long, 4 mm thick : Gall No. 343 by Curculionid.

Oval or fusiform, sometimes subglobose, solid, woody swelling of branch of *Butea frondosa* Koen., 30 mm long and 20 mm thick : Gall No. 133 by *Pachyonyx quadridens* Chevr.

Fusiform or oval, indehiscent, solid, smooth rindengall on *Desmodium* sp., 10-20 mm long and 5 mm thick : Gall No. 488 by Curculionid.

Oval or fusiform, unilocular, soft, smooth swelling of tender branch of *Rhynchosia minima* DC., 8 mm long, 4 mm thick : Gall No. 333 by *Pachyonyx menoni* Bose.

61. Subglobose or oval, indehiscent, smooth, succulent, green, unilocular swelling of branch of *Desmodium* sp., 4-16 mm long, 4-10 mm thick ; rugose when old : Gall No. 385 by Lepidoptera.

Irregular rindengall on *Desmodium pulchellum* Benth., with spiral larval cavity : Gall No. 159 by Lepidoptera.

62. Hymenopterocecidia 63

Dipterocecidia .. 65

63. Globose, often agglomerated, solid, hard, woody swellings on branch of *Prosopis juliflora* Linn., brown, smooth, 25-75 mm in diameter ; with 200-500 small, oval, peripheral larval cavities imbedded in the woody core just beneath the epidermis, which peels off when mature : Gall No. 274 by Chalcid.

64. Diffuse, solid, hard, woody swelling of the branch of *Pongamia glabra* Vent., 10 mm long, 5 mm thick, with 4-5 oval larval cavities in the middle : Gall No. 411 by Agromyzid.

Localized or also extensive, globose, pyriform or moniliform, solid, smooth, green swelling of tender branch of *Pongamia glabra* Vent., 10-20 mm in diameter : Gall No. 201 by *Myricomyia pongamiae* Mani.

65. Gall on petiole and or on leaf veins .. 66

Gall on leaf blade 67

66. Localized or sometimes extensive, globose, fusiform, or moniliform, solid, smooth, yellowish-green swelling of the petiole and midrib of *Pongamia glabra* Vent., 10-20 mm in diameter : Gall No. 201 by *Myricomyia pongamiae* Mani.

Globose or fusiform, hard, woody, unilocular swelling of the rachis of *Prosopis juliflora* Linn., 5-8 mm thick : Gall No. 211 by *Lobopteromyia prosopidis* Mani.

Same as the foregoing but on *Prosopis spicigera* Linn. Gall No. 212 by *Lobopteromyia prosopidis* Mani.

67. Pockengall, binding two leaflets of *Dichrostachys cinerea* W. & A., hardly 1 mm in diameter, yellow, pink, violet or reddish-brown : Gall No. 16 by *Eriophyes dichrostachia* Tuck.

Pouch gall 68

68. Sessile gall .. 69

Petiolate pouch gall 70

69. Globose and often agglomerate masses of solid, hard growths on *Prosopis juliflora* Linn., 1.5 mm-10 mm : Gall No. 18 by *Eriophyes prosopidis* Saksena.

Similar to the foregoing ; on *P. spicigera* Linn. : Gall No. 664 by *Eriophyes.*

Epiphyllous, large, gall with wide open ostiole on *Dalbergia sissoo* : Gall No. 345 by *Eriophyes* sp.

70. Lop-sided cephaloneon, epiphyllous gall on *Pongamia glabra* Vent., 10 mm high, 1-2 mm thick at base and 5 mm thick apically ; ostiole minute, hypophyllous ; smooth, green ; cavity with fleshy emergences and brown or white erineum : Gall No. 17 by *Eriophyes cheriani* Massee.

Similar to the foregoing, but somewhat smaller and on leaflets of *Dalbergia sissoo* Roxb. : Gall No. 15 by *Eriophyes* sp.

71. Whole flower swollen into gall 72

Only the ovary turned into gall .. 73

72. Subglobose or pyriform, solid, fleshy, 3-5 mm in diameter ; on *Desmodium biarticulatum* Benth. : Gall No. 199 by *Asphondylia* sp.

Irregular, oval or pyriform or globose, solid, lobed, agglomerate, hard swellings, 5-30 mm in diameter ; smooth, yellow to reddish-brown ; on *Prosopis juliflora* Linn. : Gall No. 19 by *Eriophyes prosopidis* Saksena.

73. Globose or pyriform, utricular swelling of the ovary of *Dichrostachys cinerea* W. & A., 5-10 mm long, 3-5 mm thick ; coriaceous and villous : Gall No. 210 by *Asphondylia utriculae* Mani.

Spherical, brown or yellowish-brown, smooth, hard, nut-like, uni- or rarely bilocular swellings of ovary of *Pongamia glabra* Vent., 5-8 mm in diameter and mistaken for a normal fruit : Gall No. 202 by *Asphondylia pongamiae* Felt.

ROSACEAE

1. Gall on *Rosa* spp. . 2

Gall on *Pirus, Prunus, Rubus* and plants of other genera .. 5

2. Shoot axis gall ; extensive, diffuse, solid swellings of tender branch of *Rosa macrophylla* Lindl., covered by orange-red spore masses of the gall-fungus : Gall No. 690 by *Phragmidium subcorticum* Schrk.

Bud or leaf gall 3

3. Bud gall ; subglobose, hard, solid, woody, green or pink to brown, smooth but spiny ; 15-35 mm in diameter ; on *R. macrophylla* Lindl. : Gall No. 497 by Cynipid.

Leaf gall .. 4

4. Oval or convex, pod-shaped leaf fold gall on *R. macrophylla* Lindl., 8 mm long, 3-4 mm thick ; tinged reddish and with surface rugose : Gall No. 607 by Cecidomyiid.

Hypophyllous, sessile, globose, smooth, yellow or pink, fleshy, unilocular on *R. macrophylla* Lindl., 5 mm in diameter : Gall No. 499 by Cynipid.

5. Gall on *Pirus, Prunus* or *Rubus* .. 6

Gall on plants of other genera 13

6. Gall on *Pirus* or *Prunus* .. 7

Gall on *Rubus* . 12

7. Epiphyllous or hypophyllous, reddish-brown, rugose, pouch gall on *Prunus persica* Benth., with wide open ostiole : Gall No. 471 by Aphid.

Irregular and extensive leaf crinkling and swelling on *P. cerasoides* D. Don : Gall No. 422 by *Schizoneura.*

8. Root gall ; irregular, solid, nodosities on *Pirus malus* Linn. : Gall No. 109 by *Eriosoma lanigera* (Hausm.).

Shoot axis gall or leaf gall .. 9

9. Shoot axis gall 10

Leaf gall .. 11

10. Irregular hollow gall on *P. malus* Linn. : Gall No. 130 by *Alcidodes mali* Marsh.

Subglobose, rugose, agglomerate, solid, hard, multilocular, rindengall on *P. pashia* Ham., 15-25 mm large : Gall No. 213 by Cecidomyiid.

11. Pod-shaped, utricular gall on *P. communis* Linn., open at both ends : Gall No. 108 by *Toxoptera punjabipyri* Das.

Epiphyllous, cylindrical, hollow, unilocular pouch gall on *P. pashia* Ham., 10-15 arranged in a regular circle ; dehiscing apically into a fringed coronae surrounding the ostiole ; 3 mm long, 1 mm thick : Gall No. 113 by Cecidomyiid.

12. Epiphyllous, subglobose, sessile, echinate gall on *Rubus assamensis* Focke : Gall No. 214 by *Schizomyia assamensis* Felt.

Hypophyllous, globose, tomentose gall on *R. micropetalus* Gardn., 5 mm in diameter : Gall No. 215 by Cecidomyiid.

13. Mostly epiphyllous, circular, discoid, unilocular, utricular pouch gall on *Deutzia staminea* R. Br., reddish-brown, 3-4 mm in diameter and 2-3 mm high : Gall No. 496 by Cecidomyiid.

COMBRETACEAE

1. Gall on *Terminalia* spp. 2

Gall on plants of other genera 19

2. Gall on shoot axis 3

Gall on bud, leaf, flower or fruit 6

3. Covering gall or rindengall on tender branch 4

Complex swellings of the branch 5

4. Diffuse, elongate, swelling of the cortex of tender branch of *Terminalia catappa* Linn., 30-50 mm long, 10-15 mm thick ; dehiscent irregularly when mature : Gall No. 700 by Psyllid.

Fusiform, unilateral rindengall on *Terminalia paniculata* Roth, 5-8 mm long and 2-3 mm thick : Gall No. 62 by *Phylloplecta hirsuta* (Crawf.).

5. Globose, hard, woody, solid, ferruginous swelling

of *Terminalia crenulata* Roth, with large central larval cavity : Gall No. 276 by Cynipid (?).

Fusiform, hard, unilocular, thick-walled swelling on *Terminalia* sp., 10 mm long and 2 mm thick ; larval cavity surrounded by sclerenchyma zone : Gall No. 63 by "insect".

6. Cordate or pyriform, hard, woody, solid, agglomerate masses of about 50 separate galls, with a solid piston-like lid of callus tissue slightly projecting from a circular ostiole on the summit and reaching nearly down to the bottom of the axial, cylindrical gall cavity ; each single gall about 10 mm long and 7 mm thick and the agglomerate masses reach a diameter of over 35 mm ; on *T. paniculata* Roth : Gall No. 466 by Cecidomyiid.

Gall on leaf, flower or fruit .. . 7

7. Gall on leaf 8

Gall on flower or fruit .. 16

8. Gall on petiole of *Terminalia* sp., subglobose, about the size of a pea-seed : Gall No. 64 by "insect".

Gall on leaf blade .. 9

9. Simple filzgall, with obscure epiphyllous bulging of the blade on *Terminalia* sp. : Gall No. 65 by *Eriophyes* sp. (?).

Roll gall or pouch gall .. 10

10. Leaf roll gall 11

Pouch gall 12

11. Epiphyllous leaf margin roll gall on *T. tomentosa* W. & A., irregularly twisted, swollen, glabrous, pale green and sometimes pink-tinged : Gall No. 66 by *Phylloplecta hirsuta* (Crawf.).

Epiphyllous leaf margin roll gall on *T. catappa* Linn., crumpled, twisted, thickened, verrucose : Gall No. 41 by Thysanoptera.

12. Sessile and small-sized, hemispherical epiphyllous .. 13

Large-sized, hypophyllous, utricular, pyriform, subcompressed, on *Terminalia* sp., with a moderately narrow neck ; coriaceous ; 25 mm long, 10-15 mm thick : Gall No. 327 by Thysanoptera.

13. Globose or lenticular gall .. 14

Cylindrical or vasiform gall 15

14. Hemispherical, fleshy, yellowish or brownish gall on *T. tomentosa* W. & A. : Gall No. 677 by *Trioza fletcheri minor* Crawf.

Subglobose and often agglomerate, glabrous or also pubescent, yellowish-green or reddish-brown, almost solid, fleshy gall *T. paniculata* Roth, 2-10 mm in diameter : Gall No. 62 by *Phylloplecta hirsuta* (Crawf.).

Spherical, smooth, brown gall on *T. arjuna* W. & A. : Gall No. 59 by *Megatrioza hirsuta* (?).

Subglobose or lenticular, sometimes agglomerate, pale yellow or brown gall on *T arjuna* W. & A., about the size of pea-seed ; ostiole hypophyllous, slit-like and covered by pubescence : Gall No. 60 by *Trioza fletcheri minor* Crawf.

Same as the preceding but somewhat larger on *T. catappa* Linn. : Gall No. 61 by *Phylloplecta hirsuta* (Crawf.).

15. Cylindrical, with flat summit on *T. glabra* R. Br. : Gall No. 20 by *Eriophyes* sp.

Vasiform, lobed, greenish-yellow, fleshy, truncated gall on *T chebula* Retz., 25-35 mm long ; smooth when immature but striated and ridged when old : Gall No. 110 by Aphid.

16. Globose, sessile, brownish-yellow, glabrous, thick-walled, fleshy swellings of whole flowers of *T paniculata* Roth, 5 mm in diameter : Gall No. 62 by *Phylloplecta hirsuta* (Crawf.).

Gall on ovary or fruit 17

17. Elliptic and somewhat beaked gall on the ovary of *T. tomentosa* W. & A. : Gall No. 278 by "Cynipid".

Fruit gall .. 18

18. Oval, solid, agglomerate, multilocular swellings on fruits of *T paniculata* Roth, with deep-seated gall cavities ; often only localized, subepidermal blisters, 5 mm in diameter : Gall No. 62 by *Phylloplecta hirsuta* (Crawf.).

Subglobose or elongate oval, truncated, solid gall on fruit of *T. arjuna* W. & A., 9-10 mm long, 6-8 mm thick : Gall No. 275 by "Cynipid".

19. Utricular gall on the axillary bud of *Calycopteris floribunda* Lamarck, globose, convoluted and lobed, verrucose-rugose, green, glabrous or somewhat pubescent, coriaceous ; 30-40 mm in diameter : Gall No. 40 by *Austrothrips cochinchinensis* Karney.

Epiphyllous, globose or pyriform, fleshy, thick-walled, yellowish-green or brown, glabrous pouch gall on leaf of *Anogeissus latifolia* Wall. : Gall No. 320 by Psyllid.

MYRTACEAE

1. Gall on shoot axis 2

Gall on bud or leaf . 3

2. Fusiform, solid, hard, woody, light-brown swelling of the tender branch of *Syzigium operculatum*

Gamble, 50-70 mm long, 25 mm thick : Gall No. 217 by Cecidomyiid.

Oval, solid, hard, woody swelling of the tender branch of *S. jambolanum* DC., 20-70 mm long and 15-20 mm thick : Gall No. 216 by Cecidomyiid.

3. Fusiform, fleshy, violet-brown swelling of the petiole of *Eugenia corymbosa* Lamarck 20-27 mm long, 5-12 mm thick : Gall No. 379 by Lepidoptera.

Gall on leaf blade 4

Gall on bud . .. 6

4. Hypophyllous, globose, succulent, fleshy, solid, 5-15 mm in diameter ; on *E. corymbosa* Lamarck : Gall No. 378 by Diptera.

Epiphyllous leaf margin roll gall on *Syzigium jambolanum* DC. : Gall No. 43 by *Eothrips jambuvasi* Ramakr.

Pouch gall .. 5

5. Epiphyllous, hemispherical, smooth, hard, green, yellow or brown on *S. jambolanum* DC., 5-7 mm in diameter : Gall No. 68 by *Trioza jambolanae* Crawf.

Epiphyllous, subpyriform, glabrous, greenish-yellow and tinged pinkish ; moderately thick-walled ; 5-10 mm thick ; often agglomerate ; on *S. jambolanum* DC. : Gall No. 679 by *Megatrioza vitiensis* (Kirkaldy).

Semiglobose, hypophyllous ; rare on *S. operculatum* Gamble : Gall No. 69 by Psyllid.

Epiphyllous, globose, 3-6 mm in diameter ; on *Eugenia malaccensis* Lamarck : Gall No. 67 by *Megatrioza vitiensis* (Kirkaldy).

6. Stunted and malformed vegetative bud of *Eugenia wightiana* Wight : Gall No. 678 by *Eriophyes cingulatus* Nalepa.

MELASTOMACEAE

1. Epiphyllous leaf margin roll gall with the blade swollen and crumpled ; on *Memecylon* sp. : Gall No. 42 by *Brachythrips dentahasta* Ramakr.

Pouch gall or complex type of gall . 2

2. Pouch gall 3

Complex type of galls .. 4

3. Hypophyllous, verrucose, pustule-like gall on *M. amplexicaule* Roxb., 3 mm in diameter, usually near the base of blade : Gall No. 337 by *Brachythrips*.

Globose, agglomerate, verrucose, yellowish-green, multichambered swelling of the entire blade of *M. umbellatum* Burm., 40 mm in diameter ; single gall 4 mm : Gall No. 458 by Thysanoptera.

4. Hypophyllous, globose, sessile, solid, fleshy succulent, yellowish-green, smooth ; 5 mm in diameter ; on *M. edule* Roxb. : Gall No. 316 by Cecidomyiid.

Hypophyllous, oblate, sessile, smooth, hollow ; with 6-7 regular lobes and superficially like a capsular fruit ; obtuse central summit ; on *M. umbellatum* Burm. : Gall No. 579 by Cecidomyiid.

ONAGRACEAE

1. Abnormally swollen fruit gall, 15-18 mm long ; on *Jussiaea repens* Linn. : Gall No. 140 by Coleoptera.

CUCURBITACEAE

1. Root gall ; irregularly globose, moniliform, fleshy, succulent ; on *Momordica dioica* Roxb. : Gall No. 334 by *Heterodera marioni* Cornu & Goodey.

Shoot axis gall 2

2. Irregular swelling of branch .. 3

Furiform or oval swelling of branch .. 4

3. Greatly lobed and knotted, solid, rugose, verrucose swelling on *Coccinia indica* Naud., 70 mm long, 30 mm thick : Gall No. 363 by *Puccinia* sp.

Irregularly globose, solid, finely tuberculated unilateral rindengall, 10 mm thick on *Cucurbita pepo* DC. : Gall No. 367 by Fungus.

4. Simple fusiform swelling .. 5

Costate or angulated swelling 6

5. Elongate fusiform, solid, fleshy swelling on *Bryonopsis laciniosa* Naud : Gall No. 218 by *Lasioptera bryoniae* Schiner.

Stout-fusiform or oval, hard, solid, fleshy, green, smooth swelling on *Coccinia indica* Naud., 25-50 mm long, 15-30 mm thick : Gall No. 219 by *Neolasioptera cephalandrae* Mani.

Extensive fusiform, solid, fleshy swelling on *Cucumis* sp. : Gall No. 454 by *Dacus cucurbitae* Coq.

Moniliform, fleshy, solid gall on *Gymnostemma pedalina* Bl., 5-25 mm long and about half as thick : Gall No. 220 by Cecidomyiid.

6. Gall on *Luffa* spp. or *Melothria* spp. 7

Gall on *Momordica* spp. or *Trichosanthes* spp. 12

7. Gall on branch of *Luffa* 8

Gall on branch of *Melothria* .. 9

8. Oval or fusiform, solid, fleshy, ribbed, green, glabrous swelling of branch of *Luffa aegyptiaca* Mill : Gall No. 221 by Cecidomyiid.

   Elongate-fusiform or somewhat carrot-shaped, curved or often twisted, obscurely ribbed, yellowish-green, solid, fleshy but moderately hard swelling of branch of *L. acutangula* Roxb., 50 mm long, 10-15 mm thick : Gall No. 576 by Cecidomyiid.

9. Gall more or less stout .. 10

   Attenuated gall 11

10. Globose, fusiform, cucumber-shaped or moniliform, fleshy, semi-succulent gall on *Melothria madaraspatana* Cogn., pentagonal in cross section, 30-45 mm long, 10-15 mm thick, longitudinally costate and ridged : Gall No. 224 by Cecidomyiid.

    Fusiform, subcylindrical, somewhat curved, solid, fleshy but hard ; yellowish-green or yellowish-brown ; with obscure longitudinal ridges and sulci ; 20-30 mm long, 10-15 mm thick : Gall No. 222 by *Prolasioptera javanica* (Kieff. & Drs van Leeuw.).

    Same as the preceding but on *M. heterophylla* Cogn : Gall No. 225 by *Prolasioptera javanica* (Kieff. & Drs van Leeuw.).

    Same as the preceding but on *M. perpusilla* Cogn. : Gall No. 225 by *Prolasioptera javanica* (Kieff. & Drs van Leeuw.).

    Oval or fusiform, fleshy, scabrid swellings or the branch of *M. odorata* Hook. : Gall No. 519 by Cecidomyiid.

11. Subcylindrical, greatly elongate, attenuated, solid, fleshy, somewhat twisted and ribbed swelling of the branch of *M. madaraspatana* Cogn., 100 mm long : Gall No. 682 by Cecidomyiid.

12. Elongate-oval or stout fusiform, solid, fleshy, succulent, contorted, tomentose, pale green swelling of the tender branch of *Trichosanthes palmata* Roxb., 50-70 mm long and 15-25 mm thick : Gall No. 681 by Cecidomyiid.

    Gall on branch of *Momordica* spp. 13

13. Slender, attenuate-fusiform, solid, fleshy, curved and ribbed angulate swelling of branch of *Momordica charantia* Linn., 100 mm long and only 10 mm thick : Gall No. 226 by *Lasioptera falcata* Felt.

    Similar to the preceding but on *M. dioica* Roxb. : Gall No. 227 by *Lasioptera falcata* Felt (?).

UMBELLIFERAE

1. Root gall ; subglobose or moniliform, solid, fleshy swellings ; 5 mm thick ; on *Centella asiatica* Urb : Gall No. 1 by *Heterodera marioni* Cornu & Goodey.

   Gall on ovary .. 2

2. Irregularly subglobose, compressed, finely rugose, rough, green, pubescent, ribbed, fleshy, succulent, 2-4 mm in diameter ; on *Pimpinella diversifolia* DC.: Gall No. 585 by *Kiefferia pimpenellae* (F. Loew).

   Globose, somewhat compressed, smooth, obscurely longitudinally lined yellowish and hairy ; solid, fleshy, succulent ; 10 mm in diameter ; on *Heracleum canescens* Lindl. : Gall No. 515 by *Kiefferia pimpenellae* (F. Loew).

ARALIACEAE

1. Globose, solid, fleshy but hard, smooth swelling of flowers of *Hedera nepalensis*, 5 mm in diameter : Gall No. 689 by Cecidomyiid.

ALANGIACEAE

1. Epiphyllous, subglobose, verrucose, sessile, sometimes agglomerate, pale or yellowish-green pouch gall on leaf of *Alangium salvifolium* Wang., 2-15 mm in diameter, with wide open hypophyllous ostiole : Gall No. 358 by *Eriophyes alangii* Nalepa.

CAPRIFOLIACEAE

1. Gall on bud 2

   Gall on leaf .. 3

2. Rosette gall, similar to gall No. 441 on *Sageretia oppositifolia* Brongn., 40 mm in diameter ; on *Viburnum coriaceum* Bl. : Gall No. 442 by Cecidomyiid.

3. Roll gall ; one or both margins rolled upward sometimes also downward to the midrib, so as to form an elongate, cylindrical, cordate or even subglobose, hollow, coriaceous mass, 10-15 mm long, 5-8 mm thick ; on *Lonicera parvifolia* Edgew. : Gall No. 594 by Cecidomyiid.

   Pouch gall ; epiphyllous, clavately subcylindrical and somewhat curved to one side apically like an inverted J ; yellowish-green or yellowish-brown ; 5 mm high and 1-2 mm thick ; with erect hairs externally ; cavity with fleshy emergences and stellate bundles of straight or curled hairs ; on *Viburnum cotinifolium* Don : Gall No. 296 by *Eriophyes viburni* Nalepa.

RUBIACEAE

1. Root gall 2

Gall on aerial part 3

2. Irregular nodosities on tender roots of the seedlings of *Cinchona* : Gall No. 391 by *Heterodera marioni* Cornu & Goodey.

Solid swellings on tender roots of *Oldenlandia umbellata* (?) : Gall No. 392 by *Heterodera marioni* Cornu & Goodey.

3. Gall on shoot axis 4

Gall on bud, leaf, inflorescence or flower 5

4. Diffusely globose or fusiform, often unilateral solid, hard, reddish-brown, sometimes moniliform swellings on *Randia malabarica* Lamarck, 15 long, 10 mm thick, with irregular bulges : Gall No. 328 by Cecidomyiid.

Globose, smooth, brown, solid, fleshy swellings of branch of *Galium mollugo* Linn., 10 mm in diameter : Gall No. 434 by Cecidomyiid.

5. Globose hollow bud gall on *Galium mollugo* Linn. : Gall No. 435 by Cecidomyiid.

Gall on leaf, inflorescence or flower 6

6. Gall on leaf 7

Gall on flower or inflorescence .. 9

7. Hypophyllous, subglobose, sessile, soft, succulent, unilocular gall on *Chomelia asiatica* O. Kze., generally on the midrib but sometimes also on the larger side veins ; 3-12 mm long and 5-10 mm thick : Gall No. 313 by Psyllid.

Epiphyllous acarocecidia 8

8. Convex green or deep violet-red on the outer margins of the larger veins of *Adina stipulata* ; 1-1.5 mm in diameter and 1 mm high ; ostiole filled with parenchyma emergences : Gall No. 335 by *Eriophyes* sp.

Globose, sessile and usually agglomerate, finely pubescent pouch gall on *Randia dumetorum* Lamarck, 2-4 mm in diameter : Gall No. 22 by *Eriophyes* sp.

9. Gall on single flowers 10

The entire inflorescence a galled mass .. 11

10. Subglobose or fusiform, somewhat compressed smooth, green or purple, solid, soft, fleshy swelling of the whole flower of *Rubia cordifolia* Linn., 6-8 mm in diameter : Gall No. 524 by Cecidomyiid.

Ceratoneon, pale yellow or yellowish-green pouch gall on the single large sepal of *Mussaenda hirsutissima* Hutch., 5 mm long, 2 mm thick Gall No. 21 by *Eriophyes* sp.

11. Globose, solid, fleshy, soft, green swollen masses on *Morinda tinctoria* Roxb., 35-40 mm thick, readily mistaken for a normal fruit (syncarpium) (especially by the presence of the usual rectangular green lines) ; formed by the fused masses of swollen thalami and flowers : Gall No. 228 by *Asphondylia morindae* Mani.

COMPOSITAE

1. Gall on root 2

Gall on aerial part 3

2. Moniliform solid swellings of roots of *Ageratum conyzoides* Linn. : Gall No. 396 by *Heterodera marioni* Cornu & Goodey.

Nodose swellings of roots of *Centrantherum relictum* Benth. & Hook. : Gall No. 397 by *Heterodera marioni* Cornu & Goodey.

Solid unilateral or moniliform swellings of roots of *Senecio zeylanicus* DC. : Gall No. 398 by *Heterodera marioni* Cornu & Goodey.

Subglobose solid unilateral or moniliform swellings of roots of *Zinnia* : Gall No. 290 by *Heterodera marioni* Cornu & Goodey.

3. Gall on shoot axis and vegetative bud 4

Gall on leaf, bract and inflorescence 8

4. Gall on shoot axis 5

Gall on bud 6

5. Globose or oval, solid, fleshy, semi-succulent swelling of branch of *Artemisia* (? *herba-alba*) 15-40 mm long : Gall No. 229 by *Clinodiplosis artemisiarum* Kieff.

Subglobose, oval or fusiform, hollow, hard local swelling of tender branch of *A. vulgaris* Linn., 30 mm long and 20 mm in diameter : Gall No. 407 by Lepidoptera.

Oval or fusiform, solid, hard, finely pubescent multilocular swelling of terminal branch of *Inula cappa* DC., 15 mm long and 10 mm in diameter : Gall No. 476 by Cecidomyiid.

Globose and verrucose, rugose, solid, fleshy, succulent swelling on *Zinnia*, 4-20 mm in diameter : Gall No. 359 by *Phytomonas tumefaciens* Sm. & Towns.

6. Rosette gall on *Achillea millefolium* Linn., subglobose, solid, fleshy, 15-20 mm in diameter : Gall No. 505 by *Rhopalomyia millefolii* (H. Loew).

Subcylindrical, fleshy, unilocular swelling of axillary bud of *A. millefolium* Linn., 10 mm large : Gall No. 527 by *Rh. millefolii* (H. Loew).

Globose gall 7

7. Solid, spongy, densely tomentose swelling on *Artemisia herba-alba* Asso, about the size of a pea-seed : Gall No. 231 by *Panteliola haasi* (Kieff.).

   Solid, fleshy but hard terminal bud swelling on *Gerbera kunzeana* Braun & Asch., surmounted by a crown of vestigial leaves, densely clothed with silvery-white hairs ; 4 mm thick : Gall No. 684 by Cecidomyiid.

   Solid, fleshy, succulent, sparsely pubescent agglomerate swelling on *Erigeron* (? *alpinum* Linn.), 10-20 mm in diameter : Gall No. 514 by Cecidomyiid.

8. Gall on leaf or bract 9

   Gall on flower and inflorescence .. 13

9. Simple leaf curl or fold gall or pouch gall .. 10

   Complex leaf and bract galls 12

10. Acarocecidia .. 11

    Reddish-brown, fleshy swelling, curling and rolling of leaf or bract of *Artemisia vulgaris* Linn., 7 mm in diameter : Gall No. 444 by Aphid.

11. Biconvex or subglobose, fleshy pouch gall on *Artemisia vulgaris* Linn., with dense silvery-white pubescence, 7 mm long, 2-3 mm thick, 5-6 mm wide ; ostiole epiphyllous or hypophyllous : Gall No. 443 by *Eriophyes affinis* Nalepa.

    Epiphyllous or hypophyllous, verrucose, hemispherical, fleshy, pubescent, thin-walled pouch gall on *Ainsliaea aptera* DC., with wide open cavity ; 5-8 mm in diameter : Gall No. 521 by *Eriophyes* sp.

12. Globose, sessile, often agglomerate, smooth, silky-white, fleshy, sparsely pubescent, unilocular, agglomerate masses of galls on *Artemisia vulgaris* Linn., 5-6 mm in diameter to 10 mm in diameter in case of the agglomerate galls : Gall No. 445 by *Rhopalomyia baijali* Mani.

    Subglobose or pyriform, often agglomerate, solid, fleshy, succulent, sparsely pubescent pale green swellings on *Erigeron* (? *alpinus* Linn.), 10-20 mm large : Gall No. 514 by Cecidomyiid.

    Subglobose, subpyriform, sessile gall on *Artemisia herba-alba* Asso, with dense white hairs ; 5 mm large : Gall No. 230 by *Rhopalomyia* sp.

13. Subglobose, solid, fleshy, brown or reddish irregularly lobed swellings of the whole capitulum of *Artemisia vulgaris* Linn., 10 mm in diameter : Gall No. 455 by *Eriophyes artemisiae horidus* Nalepa.

VACCINIACEAE

1. Irregularly globose, lobed, utricular, coriaceous reddish-brown gall on terminal bud and tender leaves of *Vaccinium leschenaultii* Wt., 80-90 mm in diameter : Gall No. 354 by Aphid.

ERICACEAE

1. Parenchyma and erineal emergence gall on leaf of *Xolisma ovalifolium* (Wall.) Rehd. ; reddish-brown ; curiously resembling the conidial spores of fungus in general appearance : Gall No. 502 by *Eriophyes* sp.

   Globose, basally strongly constricted, hypophyllous, solid, spongy, pale cottony gall on *Rhododendron arboreum* Sm., 20-30 mm large : Gall No. 421 by *Exobasidium rhododendri* Crow.

MYRSINACEAE

1. Gall on leaf 2

   Gall on ovary or on fruit 3

2. Globose clusters, superficially like a bunch of flower buds, of smooth, yellow coriaceous pouch galls on *Maesa perrottetiana* A. DC., spongy : Gall No. 126 by Psyllid.

   Hypophyllous, conical, unilocular, thick-walled pouch gall on midrib, 15 mm thick basally, 3 mm high ; on *M. perrottetiana* A. DC. : Gall No. 234 by *Oligotrophus quadrilobatus* Kieff.

SAPOTACEAE

1. Gall on shoot axis and leaf 2

   Gall on flower 11

2. Gall on shoot axis 3

   Gall on leaf 4

3. Irregular, solid, localized rindengall on tender branch of *Bassia longifolia* Linn., developing under epidermis and erupting by its rupture when the galls are mature : Gall No. 362 by Cecidomyiid.

   Globose, smooth, brown, solid, hard swelling of the tender branch of *Mimusops hexandra* Roxb., 10 mm thick : Gall No. 686 by Cecidomyiid.

4. Leaf roll gall on *Mimusops elengi* Linn. : Gall No. 44 by *Arrhenothrips ramakrishnai* Hood.

   Complex gall on leaf blade and vein 5

5. Gall a swelling of the midrib and other veins 6

   Gall not restricted to the veins 7

6. Hypophyllous, fusiform, solid swelling of midrib of *Bassia longifolia* Linn. : Gall No. 352 by Cecidomyiid.

Hypophyllous, fusiform and often moniliform, thick-walled, unilocular swellings of nearly all the veins of *B. latifolia* Roxb., brown, smooth, 4-5 mm long, 1-2 mm thick ; usually over 200 galls develop on a single leaf : Gall No. 321 by Chalcid.

7. Lenticular or flat disc-like gall .. 8

Hemispherical or subglobose, hypophyllous, rugose, fleshy, solid, unilocular swelling of leaf margin of *B. latifolia* Roxb., 1-5 mm in diameter : Gall No. 581 by Cecidomyiid.

8. Gall nearly equally developed on both sides of the blade .. 9

Gall not equally developed on the two sides of the blade .. 10

9. Circular pustules ; fleshy, 3-5 mm in diameter ; near the secondary veins of *B. longifolia* Linn. : Gall No. 685 by Cecidomyiid.

Solid, hard, discoid gall on *B. longifolia* Linn., 3-5 mm in diameter : Gall No. 353 by Cecidomyiid.

10. Epiphyllous, circular, subconvex or hemispherical, sessile, solid, fleshy, succulent yellow swelling of the blade of *B. latifolia* Roxb., 3-6 mm in diameter : Gall No. 317 by Cecidomyiid.

Subglobose, solid, hard, green, smooth swelling on *Mimusops hexandra* Roxb., unequally developed on the two sides of the blade, 5-8 mm in diameter and 4-6 mm thick : Gall No. 678 by Cecidomyiid.

11. Globose, dark green, solid, spongy swelling on *M. hexandra* Roxb., 10-20 mm in diameter, with a thick, hard stony rind, so that the gall has a superficial appearance of a miniature fruit of the wood-apple tree ; when mature the stony rind breaks open, exposing the spongy core containing the mature pupae : Gall No. 235 by *Pruthidiplosis mimusopsicola* Mani.

EBENACEAE

1. Epiphyllous, yellowish-red, sometimes agglomerate pouch gall on *Diospyros melanoxylon* Roxb. : Gall No. 70 by *Trioza obsleta* (Buckt.).

SYMPLOCOCEAE

1. Gall on shoot axis or bud 2

Gall on leaf 3

2. Subglobose or button-shaped, usually unilateral rindengall, developing in large numbers all around the stem of *Symplocos theaefolia* D. Don: Gall No. 236 by *Contarinia pulcherrima* (Kieff.).

Globose, smooth, green, violet or bluish, solid, fleshy, uni- or bilocular swelling of buds of *S. theaefolia* D. Don, with umbilicate depression on the summit, 8-10 mm in diameter : Gall No. 71 by *Cecidotrioza baccarum* Kieff.

3. Mainly hypophyllous, hemispherical or subconical gall on midrib of *S. theaefolia* D. Don, 5-6 mm in diameter, 4 mm high ; green, thick-walled, fleshy : Gall No. 72 *Ozotrioza styracearum* Kieff.

STYRACACEAE

1. Terminal vegetative bud gall in *Styrax hookeri* Clarke : Gall No. 125 by Aphid.

Flower gall on *S. serulatum* Roxb., with the thalamuspeduncle swollen ; encircled by the cylindrically elongated bracts : Gall No. 571 by *Astegopteryx steracophila* Karsch.

OLEACEAE

1. Mycocecidium 2

Gall caused by insect .. 3

2. Localized or extensive swelling of variable shape and size on branch, petiole and leaf blade of *Jasminum grandiflorum* Linn., solid, fleshy, red, violet or grey coloured : Gall No. 387 by *Puccinia jasmini* DC.

Similar to the above but usually bright orange or red and also more extensive ; on *J. trichotomum* Heyne : Gall No. 368 by *Puccinia jasmini* DC.

3. Gall on shoot axis ; globose or often confluent and moniliform, solid, hard swelling of the tender branch of *J. dispermum* Wall., 20-30 mm long, 10 mm thick : Gall No. 439 by Cecidomyiid.

Gall on flower or fruit .. 4

4. Elongate-cylindrical and fusiform leaf roll gall on *J. pubescens* Willd., spirally twisted, verrucose, coriaceous, 75 mm thick : Gall No. 45 by *Eothrips aswamukha* Ramakr.

Fleshy, succulent, solid, irregular swelling of the flower of *J. sambac* Ait., 10-15 mm thick : Gall No. 412 by *Contarinia maculipennis* Felt.

SALVADORACEAE

1. Shoot axis gall .. 2

Gall on leaf or flower 3

2. Subglobose or fusiform, sometimes extensive and cylindrical, solid, hard swelling of the tender branch of *Salvadora oleoides* Dim., 25-30 mm long, 10-15 mm thick ; the cylindrical gall reach

lengths of 80 mm or more : Gall No. 168 by *Thomasiniana salvadorae* Rao.

Globose or hemispherical, unilateral, fleshy but hard swelling of the tender branch of *S. persica* Linn. : Gall No. 691 by Cecidomyiid.

3. Mostly epiphyllous, globose agglomerate, yellow, smooth pouch gall, with wide open hypophyllous ostiole, 5-30 mm large ; on *S. persica* Linn. : Gall No. 356 by *Eriophyes* sp.

Flower gall, with the petals and sepals moderately swollen and crumpled and enlarged ; 10 mm large ; on *S. persica* Linn. : Gall No. 23 by *Eriophyes* sp.

APOCYNACEAE

1. Gall on shoot axis or leaf .. 2

Gall on flower or fruit .. 7

2. Gall on shoot axis 3

Gall on leaf .. 4

3. Oval or fusiform, sometimes moniliform, brown, solid, woody swelling of the tender branch of *Carissa carandas* Linn., 15 mm long, 7 mm thick : Gall No. 237 by Cecidomyiid.

Similar to the foregoing but somewhat larger and on *C. spinarum* Linn. : Gall No. 238 by Cecidomyiid.

4. Gall confined to petiole, midrib or larger veins 5

Gall on the leaf blade .. 6

5. Fusiform, solid swelling on *Ervatania* (= *Tabernemontana*) *coronaria* Stapf, with numerous larval cavities : Gall No. 239 by Cecidomyiid.

Globose and often agglomerate swelling of petiole and veins, glabrous, 5-10 mm thick, on *Hoya parasitica* Wall. : Gall No. 241 by Cecidomyiid.

6. Semiglobose or obtusely conical on one side of the blade and truncated conical on the other side, 2.5 mm in diameter above and 3 mm below and 5-6 mm long ; green when young and yellow when old ; ostiole a circular opening on the truncated conical part ; on *Alstonia scholaris* R. Br. : Gall No. 73 by *Pauropsylla tuberculata* Crawf.

7. Gall on flower .. 8

Gall on fruit 10

8. Whole flower develops into gall .. 9

Oval or shortly fusiform, stout, smooth, yellowish-green, solid, hard, fibrous swelling on *Hemidesmus indicus* R. Br., superficially like an ordinary fruit ; larval cavities numerous with sclerenchyma zone ; 30-40 mm long and 25 mm in diameter : Gall No. 690 by Chalcid.

9. Subglobose, solid, indehiscent, fleshy, soft, yellowish-green, pubescent swelling on *Gymnema* sp., with large fleshy adnate foliaceous structures, representing apically the altered sepals : Gall No. 464 by Cecidomyiid.

Subglobose, solid, indehiscent, fleshy, pubescent, pale green swelling on *Pergularia extensa* N.E. Br., 5 mm thick : Gall No. 462 by Cecidomyiid.

Subglobose, solid, fleshy swelling of the flower of *Ervatania coronaria* Stapf : Gall No. 240 by Cecidomyiid.

Irregularly globose, smooth, pale green, fleshy, solid, agglomerated bunches of galls, 30 mm in diameter on *Alstonia scholaris* R. Br., with swollen calyx corolla and ovary : Gall No. 705 by *Pauropsylla tuberculata* Crawf.

10. Elongate, solid, extensive and cylindrical swelling of the young fruit of *Alstonia scholaris* R. Br., with numerous larval chambers in a linear series ; 10-50 cm long, 15-20 mm thick : Gall No. 701 by *Pauropsylla tuberculata* Crawf.

LOGANIACEAE

1. Epiphyllous pouch gall on *Strychnos nux-vomica* Linn., 0.5-3.0 mm in diameter : Gall No. 383 by *Diaphorina truncata* Crawf.

Globose, pyriform or clavate, often button-shaped, solid, hard, pale green or yellow, smooth on the epiphyllous and rugose on the hypophyllous part ; 3 mm thick ; on *S. potatorum* Linn. f. : Gall No. 242 by Cecidomyiid.

BORAGINACEAE

1. Irregular tumescent swelling of the top root of *Cynoglossum lanceolatum* Forsk. : Gall No. 142 by Curculionidae.

Gall on aerial part 2

2. Gall on leaf 3

Gall on flower .. 5

3. Gall confined to petiole, midrib or larger veins ; fusiform, unilateral, solid, woody, 15 mm long, 5 mm thick ; on *Cordia myxa* Linn. : Gall No. 14 by *Baris cordiae* Marsh.

Gall not limited to veins but involving the blade also 4

4. Yellow or pale green filzgall ; often with epiphyllous outpocketing, 3-4 mm large ; erineum long, multicellular, unbranched ; on *C. myxa* Linn. : Gall No. 24 by *Eriophyes cordiae* Nalepa.

Irregular, crumpled and swollen outpocketing of the blade of *Ehretia laevis* Roxb., with dense erineum : Gall No. 401 by *Eriophyes ehretiae* Nalepa.

5. Only the ovary turned into gall ; calyx enlarged into an urn-shaped or pyriform structure ; on *C. myxa* Linn. : Gall No. 243 by Cecidomyiid.
Entire flower turned into gall 6

6. Irregularly subglobose, fleshy swelling on *Cynoglossum micranthum* Desf., enclosed in the somewhat enlarged sepals ; 4 mm large : Gall No. 516 by Cecidomyiid.
Irregular, solid, fleshy, lobulated, green, finely hairy swollen masses of the entire flower of *Ehretia laevis* Roxb., 20 mm in horizontal diameter and 10-15 mm thick ; with dense, irregular, fleshy emergences : Gall No. 318 by *Eriophyes ehretiae* Nalepa.

CONVOLVULACEAE

1. Gall on shoot axis or on bud 2
Gall on leaf or flower 7

2. Rosette gall of terminal bud, clothed with dense silvery-white pubescence ; on *Convolvulus pluricaulis* Choisy : Gall No. 403 by *Eriophyes.*
Shoot axis gall . 3

3. Gall a simple swelling of the tender branch 4
Rindengall or covering gall .. 5

4. Globose or moniliform, solid, unilocular, yellowish swelling of *Cuscuta reflexa* Roxb., 5 mm thick : Gall No. 143 by Curculionid.
Globose, yellowish-green swelling of the tender branch of *Convolvulus pluricaulis* Choisy, 10 mm large : Gall No. 402 by Curculionid.

5. Covering gall on *Ipomaea staphylina* Roem. & Sch., globose, sessile, yellow, 4-6 mm wide, 2-4 mm high ; minute ostiole on summit ; gall cavity filled with erineum from fleshy emergences : Gall No. 27 by *Eriophyes gastrotrichus* Nalepa.
Rindengall 6

6. Irregularly globose, solid, parenchyma emergence gall on *I. pes-tigridis* Linn., about 25 mm thick, with granular surface : Gall No. 26 by *Eriophyes* sp.
Irregularly globose, solid, fleshy, granular parenchyma emergence gall on an unidentified plant, 15 mm thick : Gall No. 366 by fungus.

7. Gall on leaf 8
Gall on flower .. 13

8. Gall on petiole or leaf blade .. 9
Gall always restricted to the leaf blade .. 12

9. Parenchyma emergence gall 10
Covering gall or pouch gall .. 11

10. Globose, solid, parenchyma emergence gall, with granular surface, sparsely pilose, 25 mm large ; on *I. pes-tigridis* Linn. : Gall No. 26 by *Eriophyes* sp.
Solid, fleshy, agglomerate, parenchyma swelling of leaf of *I. scindica* Stocks, 25 mm large : Gall No. 25 by *Eriophyes* sp.

11. Subglobose, smooth, yellow covering gall on *I. staphylina* Roem. & Sch., 4-6 mm wide, 2-4 mm high, with minute ostiole on the summit : Gall No. 27 by *Eriophyes gastrotrichus* Nalepa.
Mostly epiphyllous pouch gall on *I. staphylina* Roem. & Sch., globose, nearly solid, sessile, yellow, glabrous, 4-6 mm wide and 2-4 mm high ; gall cavity filled up with parenchyma septal outgrowth and simple erineum : Gall No. 27 by *Eriophyes gastrotrichus* Nalepa.

12. Leaf fold gall ; globose or strongly biconvex, yellowish-green, solid, smooth, spongy swelling of the folded halves of the blade of *Rivea hypocrateriformis* Choisy, fused together ; with only the apical and narrow marginal areas flat ; 75 mm long and 20 mm thick : Gall No. 247 by *Asphondylia riveae* Mani.
Epiphyllous, pyriform, thick-walled, unilocular, yellow, glabrous, coriaceous gall on *I. staphylina* Roem. & Sch., connecting the two halves of the blade near the midrib ; 5-8 mm large : Gall No. 246 by *Asphondylia ipomaeae* Felt.

13. Acarocecidia on flower, floral axis or on bract 14
Gall caused by insect 15

14. Irregularly globose, solid, fleshy and agglomerate swelling of the flowers, bracts and sometimes also of several closely crowded flowers of *I. scindica* Stocks : Gall No. 25 by *Eriophyes* sp.
Globose, solid, parenchyma emergence swelling on *I. pes-tigridis* Linn., with granular surface : Gall No. 26 by *Eriophyes* sp.

15. Irregularly globose, solid, fleshy swelling of the petals and stamens of *Aniseia uniflora* Choisy, basally contained within the hypertrophied and swollen three outer and two inner sepals ; pale green ; 15-20 mm in diameter : Gall No. 465 by Cecidomyiid.
Irregularly globose, solid, fleshy, yellow or brown, granular swelling of the whole flower of *I. sepiaria* Koen., 15-25 mm in diameter : Gall No. 245 by Cecidomyiid.
Similar to the preceding but on *I. cairica* Sweet : Gall No. 244 by *Schizomyia cheriani* Mani.
Irregularly globose, lobed, rugose, solid, fleshy,

brown swelling of the whole flower of *Rivea hypocrateriformis* Choisy, with the pedicel also tumid ; 15-25 mm in diameter : Gall No. 248 by Cecidomyiid.

SOLANACEAE

1. Gall on root or other subterranean parts . 2
Gall on aerial parts .. 3
2. Extensive globose or fusiform, fleshy swelling of the root of *Lycopersicum esculentum* Mill : Gall No. 289 by *Heterodera marioni* Cornu & Goodey.
Irregular tuberosities on the stem tuber of *Solanum tuberosum* : Gall No. 395 by *Heterodera marioni* Cornu & Goodey.
3. Swelling of the shoot axis of *Nicotiana tabacum* Linn., fusiform, hollow and thick-walled : Gall No. 163 by *Phthorimea heliopa* (Low).
Gall on flower .. 4
4. Irregularly subglobose, fleshy swelling of the flower of *Solanum melongena* Linn., with the petals swollen and rolled in : Gall No. 348 by *Asphondylia beguni* Mani.
Irregularly globose, fleshy swelling of the flower bud and ovary of *Capsicum annuum* Linn. : Gall No. 341 by *Asphondylia capsici* Barnes.

SCROPHULARIACEAE

1. Fusiform hollow swelling of the tender branch of *Striga orobanchoides* Benth., 8 mm long and 5 mm thick : Gall No. 468 by Curculionid.

GESNERACEAE

1. Globose, solid, fleshy, brown, rugose, often agglomerate swelling of the branch of *Aeschynanthus perrottetii* A. DC., 5-8 mm large : Gall No. 306 by *Prolasioptera aeschynanthus-perrottetii* Mani.

BIGNONIACEAE

1. Gall on vegetative organ .. 2
Gall on ovary 3
2. Gall a small swelling of the young branch of *Tecoma undulata* G. Don : Gall No. 566 by Cecidomyiid.
Hypophyllous, subglobose, shortly stalked gall on *T. undulata* G. Don, inserted on the veins ; 4-6 mm in diameter ; with an umbilicus-pit on the summit ; larval cavity with sclerenchyma zone : Gall No. 250 by *Schizomyia indica* Kieff.
3. Subcompressed fusiform or reniform, somewhat beaked gall on *Stereospermum tetragonum* DC., 25 mm long and 15 mm thick (instead of the normal fruit measuring about 33 cm long) : Gall No. 249 by Thysanoptera.

PEDALIACEAE

1. Irregular, fleshy but crumpled and contorted swelling of the flower of *Sesamum indicum* Linn. : Gall No. 251 by *Asphondylia sesami* Felt.

ACANTHACEAE

1. Gall on root 2
Gall on shoot axis or leaf 3
2. Globose, localized, rarely extensive, solid, fleshy swelling of roots of *Ruellia prostrata* Poir., 3-15 mm in diameter : Gall No. 2 by *Heterodera marioni* Cornu & Goodey.
3. Gall on shoot axis 4
Gall on leaf 9
4. Mycocecidium on tender branch of *Strobilanthes dalhousianus* Clarke ; subglobose or moniliform, dirty-white, rough, solid, often unilateral rindengall, 5-10 mm thick : Gall No. 520 by *Albugo* sp.
Gall caused by insect .. 5
5. Fusiform, hollow swelling of the main axis of *S. integrifolia* O. Kze., 12 mm long, 5 mm thick, brown and pubescent : Gall No. 580 by Lepidoptera.
Gall caused by Diptera or Coleoptera 6
6. Gall caused by Coleoptera ; elongate-oval or fusiform, solid, terminal, rarely internodal swelling on *Justicia diffusa* Willd., 10 mm long, 3-5 mm thick : Gall No. 144 by Curculionid.
Gall caused by Diptera (Itonididae) 7
7. Rindengall on *Asystasia gangetica* T. Anders., subglobose or fusiform, localized or extensive, unilateral, solid, brown, smooth ; 5-8 mm thick : Gall No. 252 by Cecidomyiid.
Gall a general swelling of the branch 8
8. Oval or fusiform, stout, sometimes unilateral swelling of tender branch of *Adhatoda vasica* Nees, 30 mm long, 10 mm thick, solid, fleshy, green and smooth : Gall No. 347 by *Lasioptera* sp.
Irregularly oval or stoutly fusiform, solid, fleshy swelling of the tender branch of *Asystasia violacea* Dalz., longitudinally furrowed ; green or brownish-red ; 5-30 mm long and 5-15 mm thick : Gall No. 305 by *Lasioptera asystaciae* Nayar.

9. Simple parenchyma emergence gall on the underside of the leaf blade of *Ruellia prostrata* Poir., 2-3 mm in diameter, cup-shaped and bright pink : Gall No. 304 by Aleurodid.

Pouch gall on *Strobilanthes dalhousianus* Clarke, mostly epiphyllous, but sometimes also hypophyllous ; globose or pyriform, agglomerate, yellowish-green or pink-violet, especially close to the midrib, 1-2 mm large ; gall cavity filled with callus-like outgrowth : Gall No. 419 by *Eriophyes* sp.

VERBENACEAE

1. Gall on shoot axis 2

Gall on leaf or flower 3

2. Irregularly globose, verrucose, multi-chambered, solid, hard, unilateral rindengall on *Tectona grandis* Linn. f., 100-200 mm long and 20-50 mm thick : Gall No. 280 by Cecidomyiid.

Pyriform swelling of the tender branch of *Clerodendron inerme* Gaertn. : Gall No. 253 by Cecidomyiid.

3. Gall on flower of *Clerodendron phlomoides* Linn. f., globose, thick-walled, utricular, coriaceous inflation of the corolla ; 9-19 mm large : Gall No. 307 by *Paracopium cingalense* (Walk.).

Gall on leaf .. 4

4. Diptera gall on *Tectona grandis* Linn., circular, depressed, disc-like, hypophyllous pouch gall, 3-4 mm wide and 1 mm high, shortly stalked ; clothed with long, erect, cottony-white, villous hairs : Gall No. 414 by Cecidomyiid.

Acarocecidia 5

5. Globose pouch gall .. 6

Clavate, lop-sided, epiphyllous, yellow, pouch gall on *Premna serratifolia* Linn., 5 mm high : Gall No. 28 by *Eriophyes premnae* Nalepa.

6. Epiphyllous, hemispherical, verrucose pouch gall on *Vitex pubescens* Vahl, 0.5-5 mm in diameter : Gall No. 29 by *Eriophyes cryptotrichus* Nalepa.

Gall epiphyllous or hypophyllous 7

7. Irregularly globose, sessile, agglomerate masses of solid, fleshy, erineum-filled pouch gall on the upper or lower side of the leaf blade of *Vitex negundo* Linn., 2-3 to 10-50 mm : Gall No. 477 by *Eriophyes* sp.

Subglobose, agglomerate, solid, fleshy, verrucose pouch gall on *Avicennia officinalis* Linn., 2-4 mm large ; outer surface densely clothed with hair-like parenchyma emergences : Gall No. 507 by *Eriophyes* sp.

NYCTAGINACEAE

1. Leaf bud gall on *Boerhaavia* spp. .. 2

Flower gall on *Boerhaavia* spp. .. 3

2. Subglobose or globose swelling ; thick, coriaceous, curled, pink-coloured leaf-fold gall : Gall No. 255 by *Punarnavomyia boerhaaviaefoliae* (Mani).

3. Globosely inflated or flask-shaped, pink-red, coriaceous swelling of the base of perianth, longitudinally 5-ridged and clothed with sticky capitate hairs ; 5 mm large : Gall No. 254 by Cecidomyiid.

AMARANTHACEAE

1. Root gall on *Amaranthus* sp., irregular and extensive fusiform, solid swelling of the lateral roots, 2-3 mm thick : Gall No. 478 by *Heterodera marioni* Cornu & Goodey.

Gall on aerial part 2

2. Gall on shoot axis 3

Gall on leaf or flower 5

3. Rindengall on *Cyathula tomentosa* Moq., in the form of irregular, warty, solid, dark reddish-brown, fleshy but hard, unilateral swellings ; 50 mm long and 20 mm in diameter : Gall No. 506 by *Eriophyes* sp.

Gall a general fusiform swelling of branch 4

4. Subglobose or fusiform, solid, smooth swelling of tender branch of *Achyranthes aspera* Linn., 10-15 mm thick : Gall No. 523 by *Lasioptera*.

Irregularly globose or fusiform, moniliform, green or brown, hollow swelling of the lower part of the branch ; 50 mm long and 10 mm thick caused by *Hypolixus trucatulus* (Fabr.) on

Amaranthus caudatus Gall No. 146
A. gangeticus Linn. Gall No. 146
A. spinosus Linn. Gall No. 147
A. viridis Linn. Gall No. 148

5. Hypophyllous, often extensive circular patches of bright pink-red parenchyma emergence growth on *Achyranthes aspera* Linn. : Gall No. 103 by Aleurodidae.

Subglobose, somewhat flattened, pinkish-red, solid, fleshy, unilocular swelling of the ovary of *Digera arvensis* Forsk., 5 mm long, 2 mm thick : Gall No. 299 by *Asphondylia digerae* Mani.

CHENOPODIACEAE

1. Leaf gall . 2

Shoot axis gall on *Salsola foetida* Del., subglobose, gemmiform, glomerulous swelling of the growing tip, 5-10 mm large, densely clothed with sublinear, unequal, actively pointed, foliaceous outgrowths : Gall No. 570 by Cecidomyiid.

2. Pod-like leaf-fold gall on *Chenopodium album* Linn., with partial fusion of the folded leaf margins, pink-red and open at both ends : Gall No. 111 by *Brevicoryne chenopodii* (Sch.).
   Pyriform, solid, succulent, glabrous swelling of the leaf blade near the midrib on *Basella rubra* Linn., 30 mm long, 25 mm thick, with numerous red coloured larvae in the fleshy substance : Gall No. 703 by *Lasioptera* (?).

POLYGONACEAE

1. Shoot axis gall .. 2
   Gall on bud or leaf 4
2. Mycocecidium on *Polygonum alatum* Ham., globose, oval or reniform, solid, fleshy, soft, smooth, pale-blue or black, unilateral rindengall, 10-12 mm in diameter : Gall No. 589 by *Ustilago* sp.
   Insect gall on branch .. 3
3. Fusiform, solid, fleshy swelling on *P. amplexicaule* Don., 25-35 mm long and 15 mm in diameter : Gall No. 525 by *Lasioptera* sp.
   Unilateral, cauline, subglobose swelling on *P. molle* Don, 50 mm long : Gall No. 256 by *Lasioptera textor* Kieff.
4. Subglobose or cordate, solid, fleshy but hard, smooth, reddish-brown swelling of the cauline buds of *P. amplexicaule* Don. : Gall No. 586 by Cecidomyiid.
   Epiphyllous, lop-sided, clavate, pubescent, yellowish-green pouch gall on *Polygonum* sp., 8 mm long, 3-5 mm thick : Gall No. 498 by *Eriophyes* sp.

PIPERACEAE

1. Root gall ; solid irregular swelling on the root of *piper nigrum* Linn. : Gall No. 400 by *Heterodera marioni* Cornu & Goodey.
   Gall on shoot axis or leaf 2
2. Irregular, succulent outgrowths on branches of *P. nigrum* Linn., often clustered together terminally, 0.5-2.5 mm long and 0.5-1.0 mm thick : Gall No. 341 by Cecidomyiid.
   Leaf gall 3
3. Leaf-fold and marginal roll gall 4
   Hypophyllous, spherical, hard, grey or brown, pellet-shape gall on *P. nigrum* Linn., 0.5-3.0 mm in diameter : Gall No. 336 by Cecidomyiid.
4. Leaf swollen and curled up on either side of the midrib so as to form a rugose tube on the leaf of *P. betle* Linn. : Gall No. 340 by *Gynaicothrips pallipes* Karny.
   Cylindrical, twisted swelling and rolling of the blade on either side of the midrib of *P. nigrum* Linn. : Gall No. 49 by *Gynaicothrips chavicae* Zimmermann.

SALICACEAE

1. Gall on *Populus* spp. 2
   Gall on *Salix* spp. 9
2. Gall on shoot axis (bud) 3
   Gall on leaf .. 6
3. Aphid gall 4
   Psyllid gall 5
4. Spherical, thick-walled, unilocular, sessile, yellowish-green or dark-brown swelling of the axillary bud of *Populus ciliata* Wall., 10-30 mm in diameter : Gall No. 115 by *Pemphigus mordwilkoi* Cholodk.
   Globose or subglobose, sessile, yellow-green gall on *P. ciliata* Wall., 5-7 mm in diameter : Gall No. 116 by *Pemphigus nainitalensis* Cholodk.
   Similar to the foregoing, but 25-75 mm large, on *P. ciliata* Wall. : Gall No. 117 by *Pemphigus napeus* Buckt.
   Fusiform, hard, deeply furrowed, hollow gall on *Populus* sp., 25-50 mm long and 25 mm thick : Gall No. 118 by *Pemphigus immunis* Buckt.
5. Globose, unilocular, rough, green covering gall on *Populus euphratica* Oliv., 12 mm thick : Gall No. 99 by *Phylloplecta* sp.
6. Aphid gall 7
   Psyllid gall 8
7. Epiphyllous, oval or subglobose, laterally compressed, lop-sided, lobed, utricular and clavate pouch gall on *Populus alba* Linn., with a narrow neck-like stalk, 20-30 mm long, 15-25 mm thick : Gall No. 121 by *Eriosoma taskhiri* Ghulamulla.
   Epiphyllous, elongately compressed, cylindrical, yellowish-green leaf-fold gall on *Populus ciliata* Wall., with stout wall, 70 mm long, 15-20 mm thick and 25 mm high, along the midrib : Gall No. 114 by *Pemphigus imaicus* Cholodk.
8. Subglobose, green or yellow to rich olive-coloured, glabrous, unilocular pouch gall on both sides of *Populus euphratica* Oliv., 5 mm large : Gall No. 98 by *Phylloplecta gardneri* Laing.
9. Leaf gall ; acarocecidia 10
   Leaf gall caused by insect 11

10. Epiphyllous, subglobose, fleshy, densely villous, yellowish-green, agglomerate, sessile pouch gall on *Salix elegans* Wall., 2-5 mm large : Gall No. 492 by *Eriophyes* sp.

Epiphyllous or also hypophyllous, globose, subconical or subcylindrical, agglomerate, yellow, semi-solid, fleshy pouch gall on *S. hastata* Linn., 3-7 mm large : Gall No. 295 by *Eriophyes* sp.

11. Epiphyllous or hypophyllous or nearly equally developed on both sides of the leaf blade of *S. fragilis* Linn., subglobose to reniform or also sausage-shaped, spongy, yellow to red-tinged kammergall, 15-50 mm in diameter : Gall No. 575 by *Pontania* sp.

Epiphyllous or hypophyllous, agglomerate, hard pouch gall on *S. daphnoides* Vill., reddish-brown, 7-10 mm large : Gall No. 418 by Cecidomyiid.

FAGACEAE

1. Gall on *Alnus* 2
Gall on *Quercus* 3
2. Epiphyllous, hemispherical, sessile, agglomerate, reddish or yellowish-brown pouch gall on *Alnus nitida* Engl., 7-10 mm long, 5 mm high ; ostiole hypophyllous and open : Gall No. 593 by *Eriophyes* sp.
3. Gall on shoot axis or bud .. 4
Gall on leaf .. 8
4. Gall on shoot axis .. 5
Gall on bud .. 6
5. Globose, irregularly oval, solid, hard swelling of the tender branch of *Quercus dilatata* Lindl. : Gall No. 596 by Cynipid.

Irregularly unilateral, subglobose or elongate-oval, agglomerate swelling of branch of *Q. spicata* Sm., 20-50 mm long and 15-20 mm thick : Gall No. 284 by *Neuroterus haasi* Kieff.

6. Pine-cone-like bud gall on *Q. griffithii* Hk. f. & T. ; subglobose or conical, spiny, imbricately scaly swelling of the terminal bud : Gall No. 285 by Cynipid.

Subglobose smooth swelling of the bud and growing point .. 7

7. Globose or fusiform, solid, woody, multilocular smooth rindengall on *Q. incana* Roxb., 15-20 mm thick : Gall No. 294 by Cynipid.

Globose or pyriform, solid, hard, multilocular rugose swelling of the growing point of *Q. incana* Roxb., 25-30 mm large : Gall No. 421 by Cynipid.

Irregularly globose, smooth, green or brown, solid swelling of the bud of *Q. semecarpifolia* Sm. : Gall No. 605 by Cynipid.

8. Erineum-filled simple pouch gall 9
Complex type of gall 10
9. Mostly epiphyllous, hemispherical, blister-like pouch gall on *Q. dilatata* Lindl., about 4 mm in diameter, yellowish-green, smooth, wide open below: Gall No. 448 by *Eriophyes* sp.

Epiphyllous, hemispherical pouch gall, 5 mm in diameter, yellowish-green, smooth, wide open below ; on *Q. incana* Roxb. : Gall No. 292 by *Eriophyes* sp.

Similar to gall No. 448, but on *Q. semecarpifolia* Sm. : Gall No. 603 by *Eriophyes* sp.

10. Gall inserted by a more or less distinct stalk or neck-like constriction on the leaf .. 11
Gall sessile .. 12
11. Mostly hypophyllous, elongate-oval, somewhat laterally compressed, mango-fruit-shaped, thick-walled, uni- or bilocular, brownish-yellow, tomentose pouch gall on *Q. incana* Roxb., 15 mm long, 8 mm wide and 5 mm thick : Gall No. 293 by Cecidomyiid.
12. Gall a pellet-shaped outgrowth on leaf .. 13
Gall a general swelling of the leaf .. 14
13. Hypophyllous, globose, unilocular, smooth, reddish-brown, close to the midrib on *Q. incana* Roxb., 5 mm long and 2 mm thick : Gall No. 433 by Cynipid.

Epiphyllous or hypophyllous, subglobose, pinkish-brown, smooth but often with 1-2 obscure, mucronate tubercles, on *Q. incana* Roxb., 5 mm in diameter : Gall No. 449 by Cynipid.

Hypophyllous, pinkish-brown, smooth gall on *Q. dilatata* Lindl., 3-3.5 mm large : Gall No. 451 by Cynipid.

14. Subglobose or hemispherical, solid, multilocular, hard, smooth, slaty-grey swelling of the leaf bud of *Q. dilatata* Lindl., 10-13 mm in diameter and 9 mm thick ; usually conspicuously gibbous on one side of the leaf blade : Gall No. 450 by Cynipid.

Oval, solid swelling of the whole leaf blade of *Q. pachyphylla* Kurz, 22 mm long, 18 mm wide and 7-9 mm thick ; with numerous obscure tuberosities : Gall No. 282 by Cynipid.

LAURACEAE

1. Shoot axis gall 2
Leaf gall 4

2. Globose or rarely irregular swelling of the inflorescence axis of *Cinnamomum zeylanicum* Breyn., bright green, soft, fleshy, 1-5 mm thick : Gall No. 381 by Cecidomyiid.

Gall on tender vegetative branch 3

3. Fusiform or subcylindrical, sessile, usually agglomerate bunches of 4-20 rindengalls on *Machilus gamblei* King, 8-12 mm long, 8 mm thick, yellow or red when young and darker when old ; thick-walled, solid, fleshy ; larval cavity axial : Gall No. 259 by *Daphnephila glandifex* Kieff.

Globose or oval, sessile, reddish, pitted, unilocular covering gall on *Phoebe* sp., 12 mm long, 7 mm thick : Gall No. 314 by Psyllid.

4. Simple "pit gall" 5

Pouch gall or other complex gall 6

5. Epiphyllous, low convex gall, with shallow, hypophyllous widely open cavity, filled with erineum ; on *Machilus micrantha* : Gall No. 36 by *Eriophyes* sp.

Epiphyllous, subconical, yellow gall on *Phoebe lanceolata* Nees, 2 mm large, widely open below and plugged by the depressed larva on level with the leaf surface : Gall No. 440 by Aleurodid.

Similar to the preceding, but on *M. odoratissima* Nees : Gall No. 495 by Aleurodid.

Similar but on *Cinnamomum camphora* Nees & Ebern. : Gall No. 83 by *Trioza camphorae* Sasaki.

6. Gall on *Cinnamomum* 7

Gall on plants of other genera 16

7. Acarocecidia .. 8

Gall by psyllid .. 9

"Cynipid" (?) gall of the size of "pea-seed" on *C. nitidum* Bl. : Gall No. 279 by Cynipid.

8. Mostly hypophyllous, conical pouch gall on *C. zeylanicum* Breyn., usually near one of the main veins, 10-15 mm large, pale green or yellowish ; cavity densely hairy : Gall No. 30 by *Eriophyes doctersi* Nalepa.

Hypophyllous rugose pouch gall on *C. zeylanicum* Breyn. : Gall No. 31 by *Eriophyes* sp.

9. Gall nearly equally or at least well developed on both sides of the leaf blade .. 10

Gall predominantly or wholly epiphyllous .. 13

10. Gall small or medium-sized, not generally exceeding 5 mm in size 11

Gall large, usually about 10-15 mm large .. 12

11 Epiphyllous portion of pouch gall conical, with an obtuse summit, hypophyllous part ellipsoidal ; 2 mm large ; on *C. iners* Reinw. : Gall No. 564 by Psyllid.

Epiphyllous portion obtuse, hypophyllous portion conical ; 2 mm large ; on *C. macrocarpum* Hook. f. : Gall No. 89 by Psyllid.

Globose galls on *C. zeylanicum ovalifolium*, 3-4 mm large : Gall No. 94 by Psyllid.

12. Ovoid, fleshy, unilocular pouch gall on *Cinnamomum* sp., 10-15 mm high, 8-10 mm thick ; epiphyllous portion conically pointed and basally surrounded by a cushion-like swelling of the blade ; hypophyllous portion sub-hemispherical : Gall No. 91 by *Phacosema gallicola* Kieff.

13. Epiphyllous pouch gall on *Cinnamomum* sp., subglobose, yellow or brown ; along the 3 major longitudinal veins ; 5-10 mm large : Gall No. 510 by Psyllid.

Epiphyllous pouch gall on *C. zeylanicum* Breyn., usually not larger 3-5 mm 14

14. Hemispherical gall about 5 mm. large : Gall No. 312 by Psyllid.

Conical or cylindrical gall, 2-3 mm large 15

15. Conical, 3 mm high, 3 mm thick at base : Gall No. 93 by Psyllid.

Cylindrical gall, 2-3 mm high and 1-2 mm thick at base : Gall No. 92 by Psyllid.

16. Gall on *Litsea, Neolitsea* or *Lindera* .. 17

Gall on other genera 24

17. Gall on *Lindera* 18

Gall on *Litsea* or *Neolitsea* 21

18. Acarocecidia 19

Psyllid or midge gall .. 20

19. Hypophyllous erineum on *Lindera assamica* Kurz, with an obscure epiphyllous bulging : Gall No. 32 by *Eriophyes* sp.

Globose or conical, glabrous, green, solid, spongy parenchyma swelling of the veins on both sides of the blade of *L. pulcherrima* Benth., 10 mm large : Gall No. 33 by *Eriophyes linderae* Corti.

20. Psyllid gall ; leaf roll gall on *L. assamica* Kurz : Gall No. 95 by Psyllid.

Midge gall ; epiphyllous, globose, yellow, thick-walled unilocular, sessile gall on *L. pulcherrima* Benth., on one of the three longitudinal veins ; 3 mm large ; ostiole an elongate hypophyllous pit : Gall No. 258 by *Daphnephila linderae* Kieff.

21. Psyllid gall 22

Acarocecidia 23

22. Globose, agglomerate, green or chocolate-coloured

pouch gall on *Litsea polyantha* Juss., of the size of a pea-seed ; on the secondary veins : Gall No. 96 by *Pauropsylla beesoni* Laing.

Biconvex green pouch gall on *Neolitsea zeylanica* Merr., visible on both sides of the blade, 8 mm large : Gall No. 370 by Psyllid.

23. Epiphyllous, irregularly subglobose pouch gall on *Litsea glabra,* about 5-10 mm large : Gall No. 415 by *Eriophyes* sp.

Epiphyllous, clavate pouch gall on *L. ligustrina* Hook., 5 mm long, 2-3 mm thick ; pale yellowish-green : Gall No. 34 by *Eriophyes* sp.

Epiphyllous clavate or globose pouch gall on *L. wightiana* Hook., 5 mm large : Gall No. 55 by *Eriophyes* sp.

24. Gall on *Machilus* spp. 25
Gall on *Beilschmiedia* or *Phoebe* 28

25. Psyllid gall 26
Midge gall .. 27

26. Epiphyllous, globose, sessile, green or red, smooth, fleshy but hard pouch gall on *M. gamblei* King, 5-6 mm large, with a verrucose hypophyllous projection ; ostiole obliterated : Gall No. 97 by *Neotrioza machili* Kieff.

Epiphyllous, cordate, pyriform or shortly conical thick-walled, hard, sessile, reddish to dark brown, smooth pouch gall on *M. odoratissima* Nees, on one of the larger veins, 15 mm long, 6-8 mm thick : Gall No. 482 by Psyllid.

27. Hypophyllous, oval or pyriform, shortly stalked, usually about 50 galls developed in a cluster on *M. odoratissima* Nees, on the upper side of the blade the gall is indicated by an obscure fleshy mucronate process 15 mm long, 8 mm thick : Gall No. 479 by *Neolasioptera* sp.

Hypophyllous, shortly stalked, oval or stout fusiform, solid, hard, green, smooth, finely and sparsely pubescent gall on *M. odoratissima* Nees, 15 mm long, 8 mm thick ; developing usually in a cluster of about 10-15 mm : Gall No. 481 by Cecidomyiid.

Hypophyllous, fusiform, somewhat basally stout, solid, yellowish-green, parenchyma mass on *M. gamblei* King, 12-18 mm long and 3-5 mm thick: Gall No. 260 by *Daphnephila haasi* Kieff.

28. Subconical galls on *Beilschmiedia sikkimensis* King ; on the sides of the midrib, both epi- and hypophyllous ; 6 mm long, 5-6 mm thick : Gall No. 86 by *Ozotrioza laurinearum* Kieff.

Hypophyllous, globose, fleshy, soft, sessile, green or yellowish-brown gall on *Phoebe* sp., 4-9 mm large : Gall No. 314 by Psyllid.

LORANTHACEAE

1. Epiphyllous leaf margin roll gall, cylindrical, 25 mm long, 5-8 mm thick, reddish-brown ; on *Loranthus elasticus* Desr. : Gall No. 38 by Thysanoptera.

BUXACEAE

1. Epiphyllous, hemispherical yellowish-green pouch gall on *Sarcococca brevifolia* Stapf, with wide-open ostiole hypophyllous ; 5 mm large : Gall No. 467 by *Eriophyes* sp.

EUPHORBIACEAE

1. Shoot axis gall 2
Leaf gall . .. 4

2. Gall a hollow, fusiform localized swelling of the tender branch of *Emblica officinalis* Gaertn., 20-25 mm long and 10-15 mm thick : Gall No. 165 by *Betousa stylophora* (Swinhoe).
Gall a solid swelling of the tender branch .. 3

3. Globose, verrucose, brown, hard swelling on *Aporosa lindleyana* Baill., 10-30 mm in diameter : Gall No. 369 by Cecidomyiid.

Irregular swellings on *Cyclostemon assamicus* Hook., 5-30 mm long, 3-20 mm thick : Gall No. 261 by *Clinodiplosis nodifex* Kieff.

4. Leaf margin roll gall on *Mallotus philippinensis* Muell., spirally twisted, pale or yellowish-green : Gall No. 308 by *Rhynchothrips raoensis* Ramakr.
Pouch gall or other complex type of galls 5

5. Psyllid gall .. 6
Diptera gall .. 10

6. Simple pouch gall 7
Complex pouch gall .. 8

7. Membranous, utricular, epiphyllous pouch gall on *Trewia nudiflora* Linn., 10 mm large : Gall No. 85 by *Trioza fletcheri* Crawf.

Subglobose, pale green, small-sized galls, often as many as 200 on a single leaf of *M. philippinensis* Muell. : Gall No. 84 by *Phylloplecta* sp.

8. Epiphyllous, globose gall on *Dimorphocalyx glabellus* Thw., with a short, neck-like basal stalk, fleshy, brownish-violet, 2-5 mm in diameter: Gall No. 311 by Psyllid.
Epiphyllous sessile pouch gall 9

9. Globose, brown on *Macaranga indica* Wt., 3 mm

large, ostiole on a hypophyllous conical projection : Gall No. 82 by Psyllid.

Subpyriform, hard, thick-walled gall on *Mallotus philippinensis* Muell., green when young and red when mature, 5-8 mm large : Gall No. 83 by *Phylloplecta malloticola* Crawf.

10. Echinate gall on *Emblica officinalis* Gaertn., composed of several leaves : Gall No. 262 by *Asphondylia phyllanthi* Felt.

Gall not echinate 11

11. Gall in the axil of the minute leaf of *Emblica officinalis* Gaertn., globose, solid, fleshy, about 3 mm in diameter : Gall No. 472 by Cecidomyiid.

12. Globose, villous, thick-walled, fleshy, hard, yellowish-green gall on *Macaranga indica* Wt., 1-4 mm in diameter : Gall No. 308 by *Schizomyia macarangae* Nayar.

Subglobose, black gall on *Aporosa* (=*Lepidostachys*) *roxburghii* Baill., with irregular surface and apical tubercle,. 0.5-1.5 mm in diameter : Gall No. 565 by Cecidomyiid.

ULMACEAE

1. Acarocecidium on *Holoptelea integrifolia* Planch., epiphyllous, hemispherical, sessile pouch gall near the midrib, 30-40 mm in diameter and 15-20 mm high ; cavity with dense brown erineal tomentum, wide open below : Gall No. 37 by *Eriophyes* sp.

Gall caused by aphid 2

2. Leaf roll gall 3

Pouch gall on *Ulmus wallichiana* Planch., epiphyllous, petiolate, clavate, lop-sided, utricular, thick-walled ; deep reddish-brown, 15-20 mm long, 5 mm thick : Gall No. 493 by Aphid.

3. Epiphyllous, irregular leaf roll gall on *U. wallichiana* Planch : Gall No. 112 by *Schizoneura campestris* (?).

Similar to the preceding, but on *U. laevigata* Royle : Gall No. 591 by *Schizoneura* sp.

URTICACEAE

1. Shoot axis gall . 2

Leaf gall 3

2. Irregularly globose or fusiform, curved, solid, fleshy swelling of the branch of *Gerardiana heterophylla* Dec., 30-50 mm long, 5-10 mm thick : Gall No. 595 by *Puccinia* sp.

Fusiform, solid, fleshy swelling of the tender branch of *Pilea umbrosa* Wedd., 20 mm long and 8 mm thick : Gall No. 618 of Cecidomyiid.

3. Ceratoneon pouch gall on *Lecanthus wightii* Wedd., membranous, conical, smooth, white, 10-15 mm long, 1.5-3 mm thick, apically somewhat obtuse : Gall No. 427 by Psyllid.

Globose pouch gall 4

4. Reddish-brown gall on *Boehmeria platyphylla* Don, visible on both sides of the blade, with separate, elongate, white, simple trichomes ; 5 mm thick : Gall No. 446 by Cecidomyiid.

Epiphyllous, hemispherical, reddish-brown, pubescent gall on *Boehmeria* sp., 5 mm large : Gall No. 417 by Psyllid.

MORACEAE

1. Gall on aerial root of *Ficus retusa* Linn., fusiform, solid, hard, 10 mm long and about 2 mm thick : Gall No. 281 by Chalcid.

Gall on shoot axis or on leaf . 2

2. Gall on shoot axis 3

Gall on leaf 6

3. Covering gall or rindengall 4

Gall a general swelling of the tender branch 5

4. Irregularly agglomerated outgrowths on *Ficus glomerata* Roxb., tuberculated, 5-15 mm long 4-10 mm thick : Gall No. 376 by Psyllid.

Globose, sometimes agglomerated mass on *F. glomerata* Roxb., 5-15 mm to 4-10 mm : Gall No. 683 by Psyllid.

5. Subglobose or fusiform swellings on *F. infectoria* Roxb., smooth, 10-15 mm thick : Gall No. 584 by Chalcid.

Fusiform, solid, hard, smooth gall on *F. bengalensis* Linn., 25-39 mm long and 10-15 mm thick : Gall No. 164 by Lepidoptera.

Irregular swelling of tender branch of *F. arnottiana* Miq. : Gall No. 680 by Cecidomyiid.

6. Echinate or densely pilose galls .. 7

Gall not echinate or densely pilose 8

7. Hypophyllous, subglobose, red coloured, solid, uni- or bilocular gall on *F. bengalensis* Linn., with fleshy, obtuse spinous processes, 5-8 mm large ; larval cavities with sclerenchyma zone : Gall No. 263 by Chalcid.

Epiphyllous, globose, yellow-green, fleshy, unilocular pouch gall on *F. nervosa* Roth, near the midrib or the base of the larger veins ; densely clothed with long, slender, brown hairs ; 15 mm in diameter : Gall No. 80 by *Dinopsylla grandis* Crawf.

8. Gall on midrib or larger veins only ; hypophyllous, extensive, fusiform, solid swellings on *F. religiosa* Linn. : Gall No. 267 by ***Pipaldiplosis pipaldiplosis*** Mani.

Gall on the blade .. 9

9. Leaf roll gall 10

Lenticular or pouch gall 11

10. Gall on *F. retusa* Linn. : Gall No. 46 by *Arrhenothrips dhumrapaksha* Ramakr.

Same as the preceding : Gall No. 47 by *Mesothrips bhimabahu* Ramakr.

Same as the preceding : Gall No. 47a by *Mesothrips apetalus* Karny.

11. *Acarocecidium* on *F. scandens* Roxb., epiphyllous, subglobose, agglomerate, modular, sessile, with erineum clothed hypophyllous cavity ; 1-5 mm large : Gall No. 480 by *Eriophyes* sp.

Gall by Psyllidae or Itonididae (Diptera) 12

12. Psyllid gall .. . 13

Diptera gall 23

13. Simple "pit gall" or open pouch gall 14

Complex and closed pouch gall .. 15

14. Hemispherical, thin-walled, epiphyllous outpocketing on *F. religiosa* Linn., with hypophyllous wide-open cavity ; 2 mm large : Gall No. 323 by *Trioza* sp.

Hemispherical, epiphyllous ; wide-open hypophyllous cavity ; 2-3 mm large ; on *F. infectoria* Roxb. : Gall No. 79 by *Trioza* sp.

Minute epiphyllous, rugose, yellowish-green gall on *F. glomerata* Roxb. : Gall No. 76 by *Pauropsylla* sp.

15. Gall usually not exceeding 5 mm in size .. 16

Gall usually 5-10 mm large or also larger .. 20

16. Epiphyllous, globose galls .. 17

Hemispherical or conical, hard, dark coloured, brittle gall on *F. hookeri* Roxb. : Gall No. 77 by *Pauropsylla ficicola* Kieff.

17. Yellow or pale coloured gall .. 18

Green or brown or dark coloured gall 19

18. Globose, isolated gall on *F. infectoria* Roxb. : Gall No. 702 by *Trioza* sp.

Subglobose gall on *F. rumphii* Bl. : Gall No. 674 by *Pauropsylla* sp.

19. Gall usually 1-3 mm large ; on *F. asperrima* Roxb.: Gall No. 309 by Psyllid.

Gall usually about 5 mm ; on *F. hookeri* Roxb. : Gall No. 78 by *Pauropsylla globuli* Kieff.

20. Mature gall with stony interior ; subglobose, depressed ; on *F. talboti* King : Gall No. 313 by *Dinopsylla grandis* (?).

Gall not stony 21

21. Gall mostly epiphyllous 22

Gall largely hypophyllous ; 10-15 mm large ; on *Ficus* sp. : Gall No. 475 by Psyllid.

22. Subglobose or pyriform, often agglomerate, thick-walled, fleshy, smooth, green or yellow gall on *F. roxburghii* Wall. ; 10-12 mm large : Gall No. 81 by *Pauropsylla* sp.

Globose or obpyriform, agglomerate, yellow, orange or red coloured, epiphyllous, fleshy gall on *F. glomerata* Roxb., 15-30 mm large : Gall No. 75 by *Pauropsylla depressa* Crawf.

Globose gall near the midrib on *Ficus* sp., 15 mm large : Gall No. 511 by Psyllid.

23. Lenticular or sublenticular or biconvex disc-like galls 25

Subglobose gall 24

24. Globose, yellow or yellowish-brown, unilocular, fleshy gall on *F. dalhousiae* Miq., 4-10 mm large : Gall No. 375 by Cecidomyiid.

Gall visible on both sides of the leaf blade of *F. foveolata* Wall., the epiphyllous part globose or hemispherical, the hypophyllous part truncately conical ; yellow, smooth ; ostiole hypophyllous and operculate ; 4 mm high, 2-3 mm large : Gall No. 426 by Cecidomyiid.

25. Lenticular, yellow, solid, circular swelling of the leaf of *F. bengalensis* Linn., 2-5 mm in diameter: Gall No. 469 by Cecidomyiid.

Biconvex, disc-like galls 26

26. Hypophyllous part somewhat more convex than the epiphyllous part ; yellow when young and dark brown when old ; on *F. glomerata* Roxb.: Gall No. 264 by *Dyodiplosis fici* Rao.

Similar to the foregoing but somewhat smaller and also more convex, on the same plant : Gall No. 265 by *Horidiplosis mathuri* Mani.

Same as the foregoing but on *F. infectoria* Roxb.: Gall No. 266 by *Horidiplosis fici* Felt.

EXPLANATION TO THE PLATES

Plate I : Figs. 1-7

1. Gall No. 27 on *Ipomaea staphylina* Roem. & Sch. by *Eriophyes gastrotriclus* Nalepa.
2. Gall No. 418 on *Salix daphnoides* Willars by Cecidomyiid.
3. Gall No. 457 on *Indigofera pulchella* Roxb. by Cecidomyiid.
4. Gall No. 360 on *Acacia leucophloea* Willd. by *Uromyclaelium* sp.
5. Gall No. 14 on *Acacia leucophloea* Willd. by *Eriophyes acaciae* Nalepa.
6. Gall No. 361 on *Citrus medica-acida* Linn. by *Sphaeropsis tumefaciens* Hedg.
7. Gall No.453 on *Acacia suma* Ham.-Buch. by *Lobopteromyia* sp.

Plate II : Figs. 1-5

1. Gall No. 321 on *Bassia latifolia* Roxb. by Chalcid.
2. Gall No. 501 on *Cinnamomum* sp. by Psyllid.
3. Gall No. 171 on *Crataeva religiosa* Forst. by *Aschistonyx crataevae* (Mani).
4. Gall No. 316 on *Memecylon edule* Roxb. by Cecidomyiid.
5. Gall No. 404 on *Acacia* sp. by fungus.

Plate III : Figs. 1-4

1. Gall No. 191 on *Mangifera indica* Linn. by Cecidomyiid.
2. Gall No. 194 on *Mangifera indica* Linn. by Cecidomyiid.
3. Gall No. 296 on *Viburnum cotinifolium* Don. by *Eriophyes viburni* Nalepa.
4. Gall No. 420 on *Berberis lycium* Royle by Trypetid.

Plate IV : Figs. 1-5

1 Gall No. 40 on *Calycopteris floribunda* Lamarck by *Austrothrips cochinchinensis* Karny.

2. Gall No. 173 on *Maerua arenaria* Hook. & Bl. by *Schizomyia maeruae* Felt.

3. Gall No. 160 on *Tephrosia purpurea* Pers. by *Dactylethra candida* Staint.

4. Gall No. 182 on *Grewia orientalis* Linn. by Cecidomyiid.

5. Gall No. 209 on *Acacia catechu* Willd. by *Lobopteromyia bivalviae* (Rao).

Plate V : Figs. 1-7

1. Gall No. 325 on *Mangifera indica* Linn. by *Amradiplosis amraemyia* (Rao).

2-3. Gall No. 197 on *Mangifera indica* Linn. by *Rhaledophaga mangiferae* (Mani).

4. & 7. Gall No. 280 on *Tectona grandis* by Cecidomyiid.

5. Gall No. 414 on *Tectona grandis* Linn. by Cecidomyiid.

6. Gall No. 323 on *Ficus religiosa* Linn. by *Trioza* sp.

Plate VI : Figs. 1-8

1. Gall No. 456 on *Acacia suma* Ham.-Buch. by *Lobopteromyia ramachandrani* Mani.

2. Gall No. 354 on *Vaccinium leschenaulti* Wt. by Aphid.

3 Gall No. 334 on *Crataeva religiosa* Forst. by *Aschistonyx crataevae* (Mani).

4. Gall No. 497 on *Rosa macrophylla* Lindl. by Cynipid.

5. Gall No. 576 on *Salix fragilis* by *Pontamia* sp.

6. Gall No. 479 on *Machilus odoratissima* Nees by *Neolasioptera* sp.

7. Gall No. 260 on *Machilus gamblei* King by *Daphnephila Haasi* Keiff.

8. Gall No. 466 on *Terminalis paniculata* Roth by Cecidomyiid.

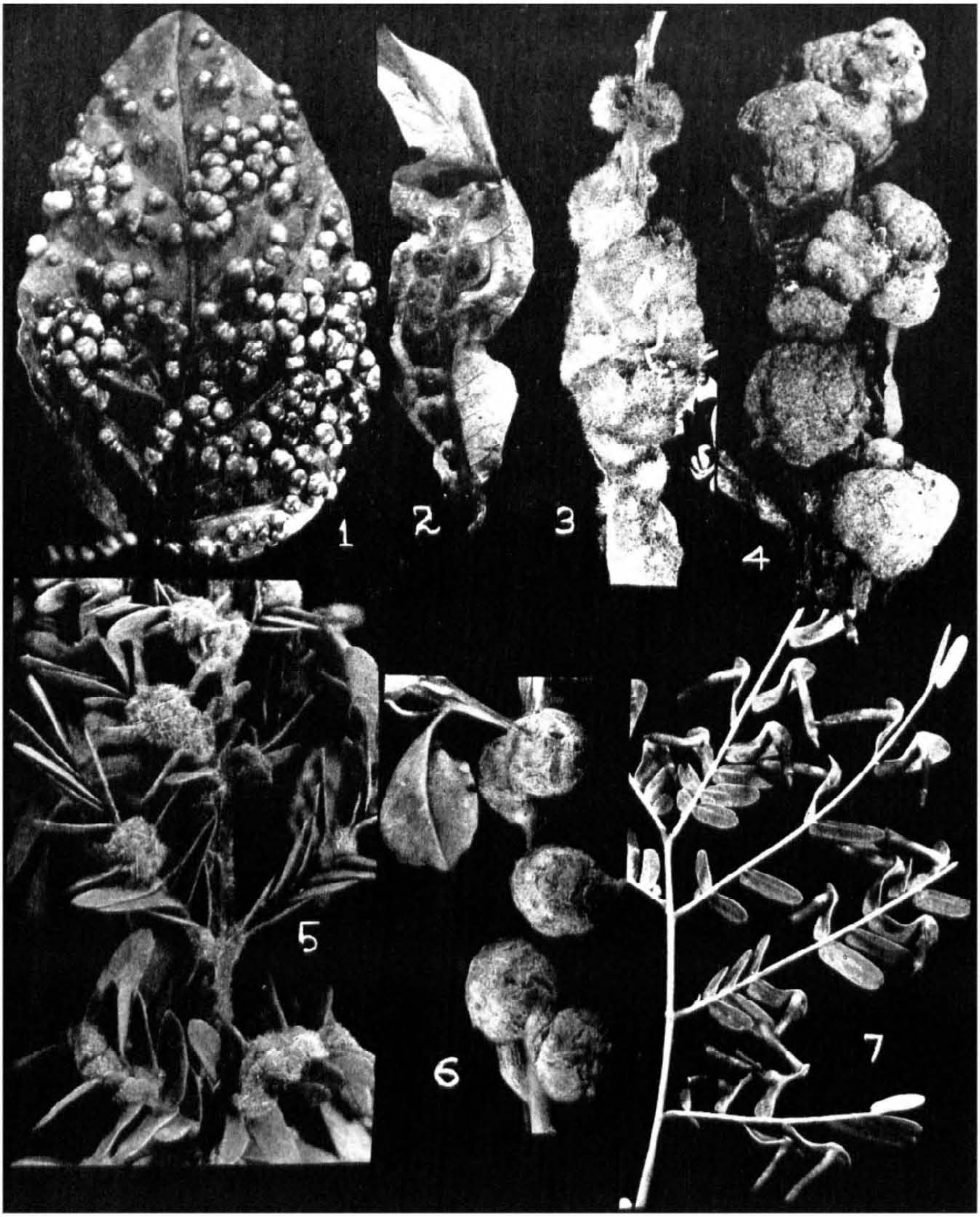


Plate I: Figs. 1-7

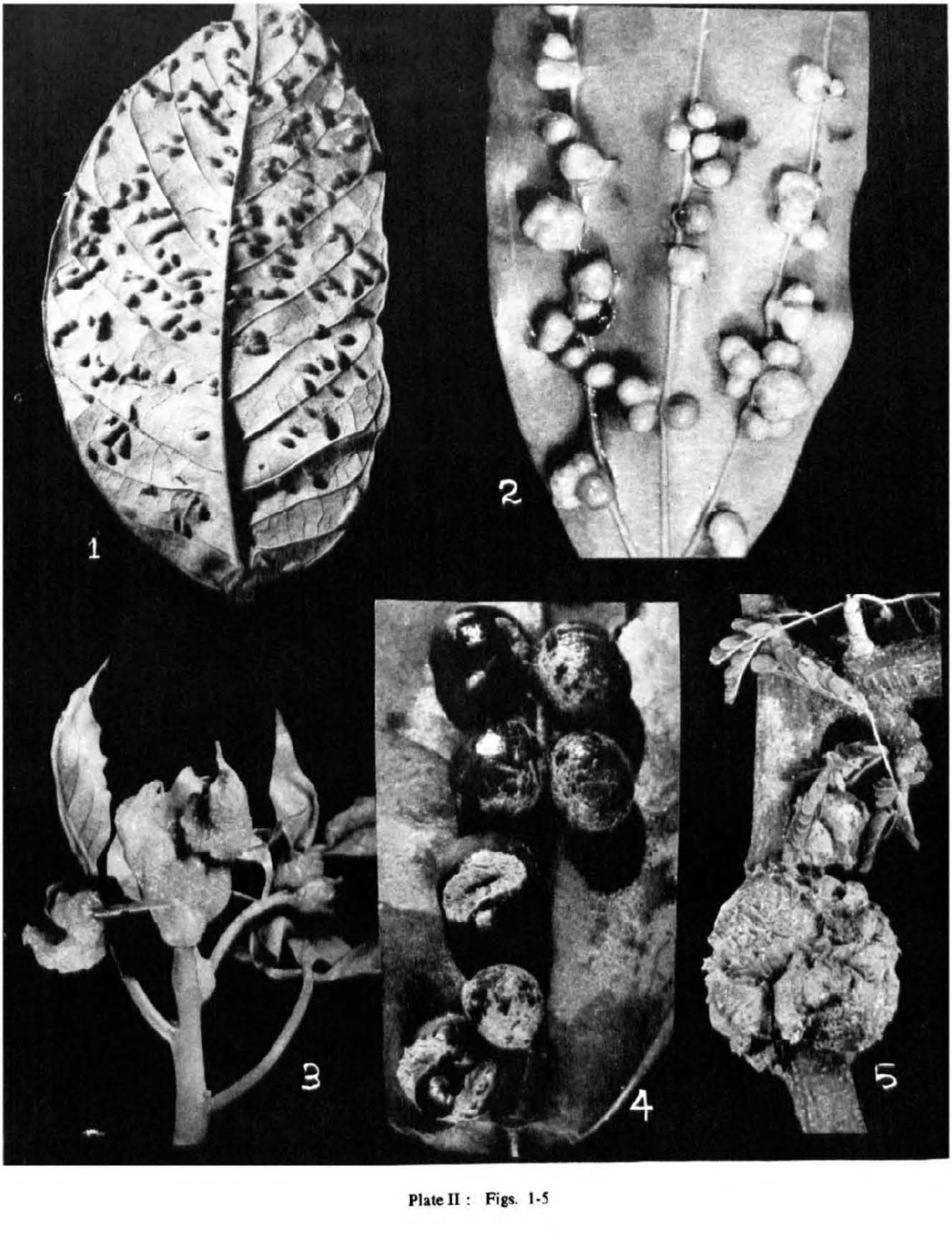


Plate II : Figs. 1-5

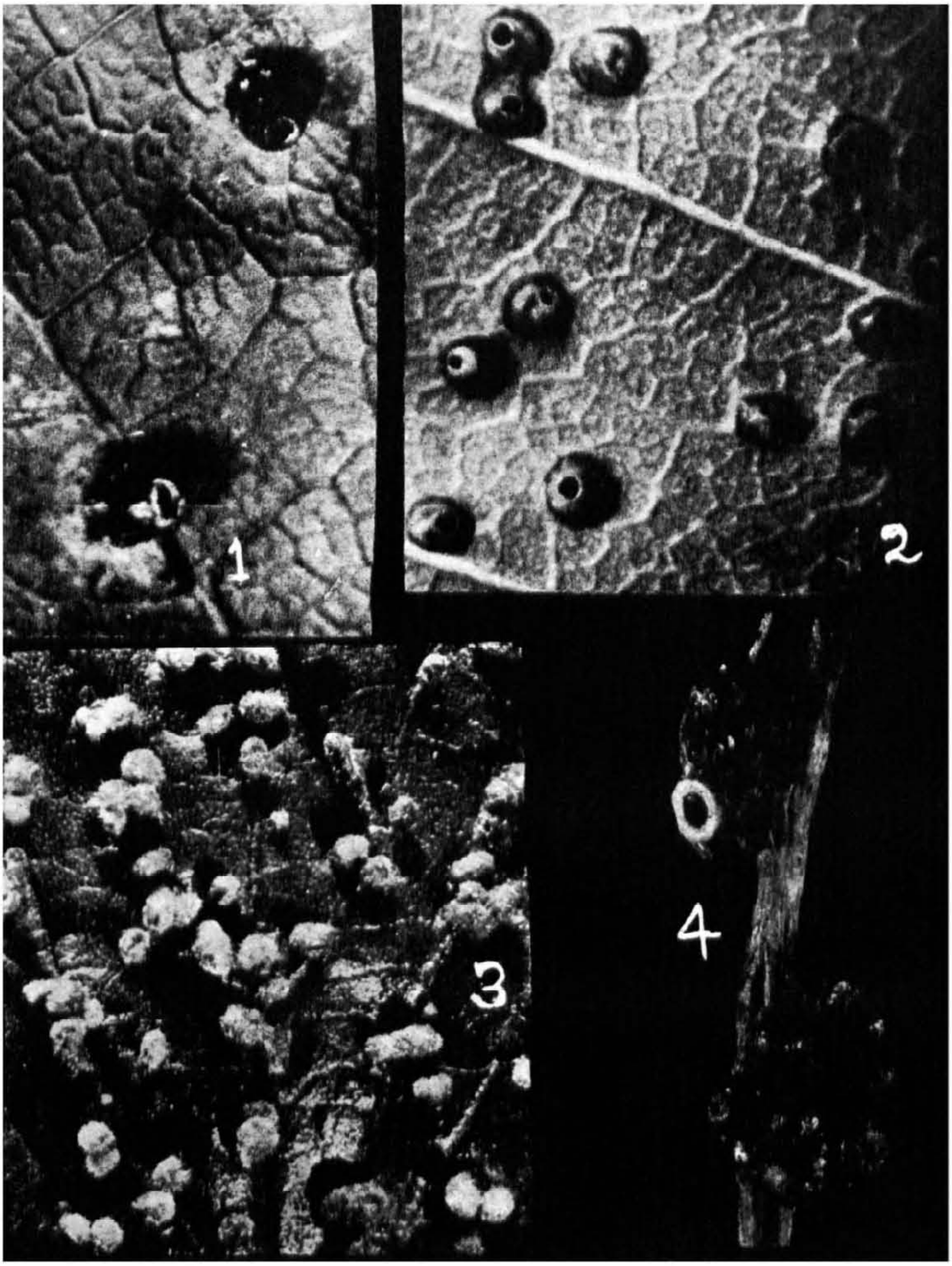


Plate III : Figs. 1-4

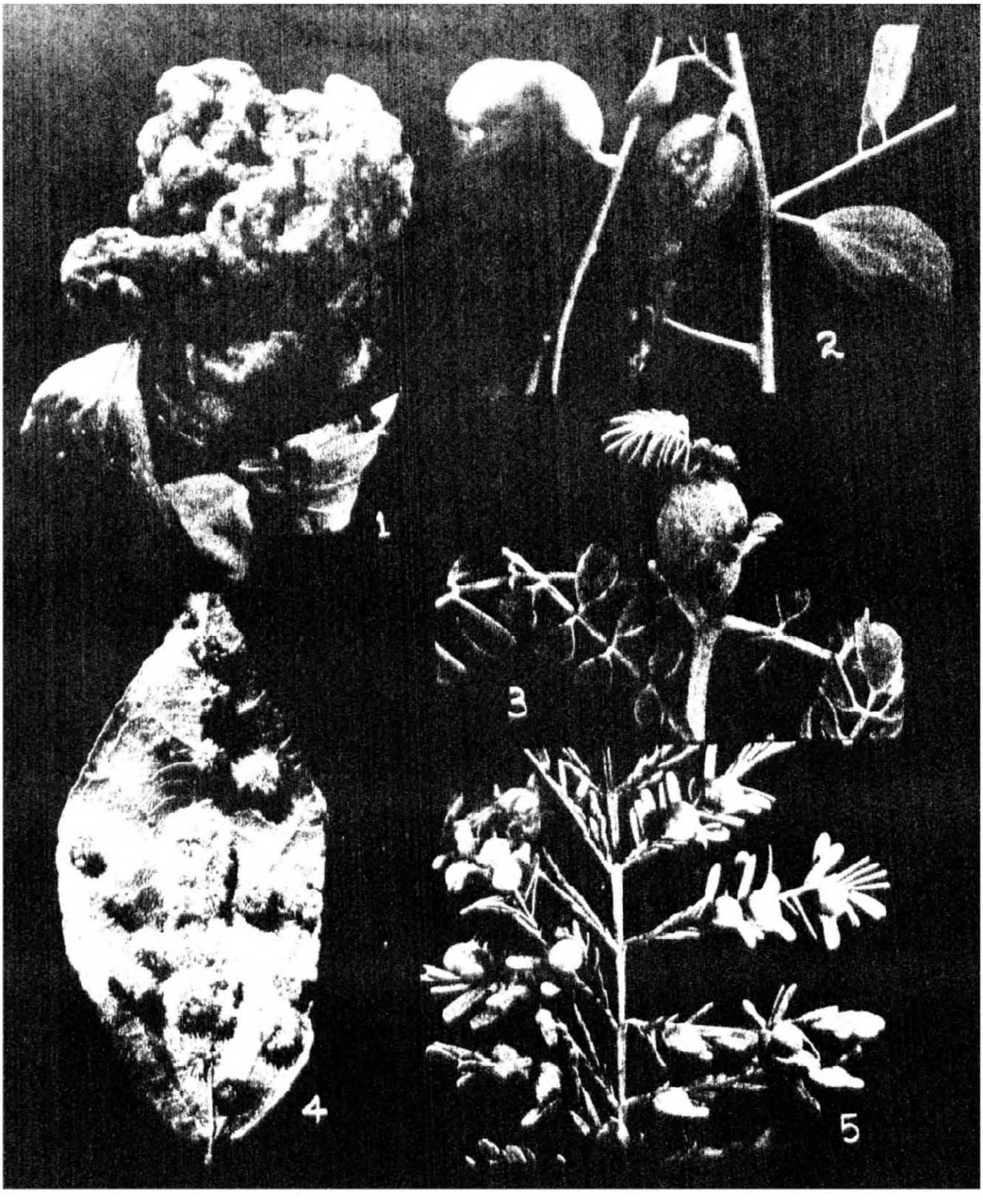


Plate IV : Figs. 1-5

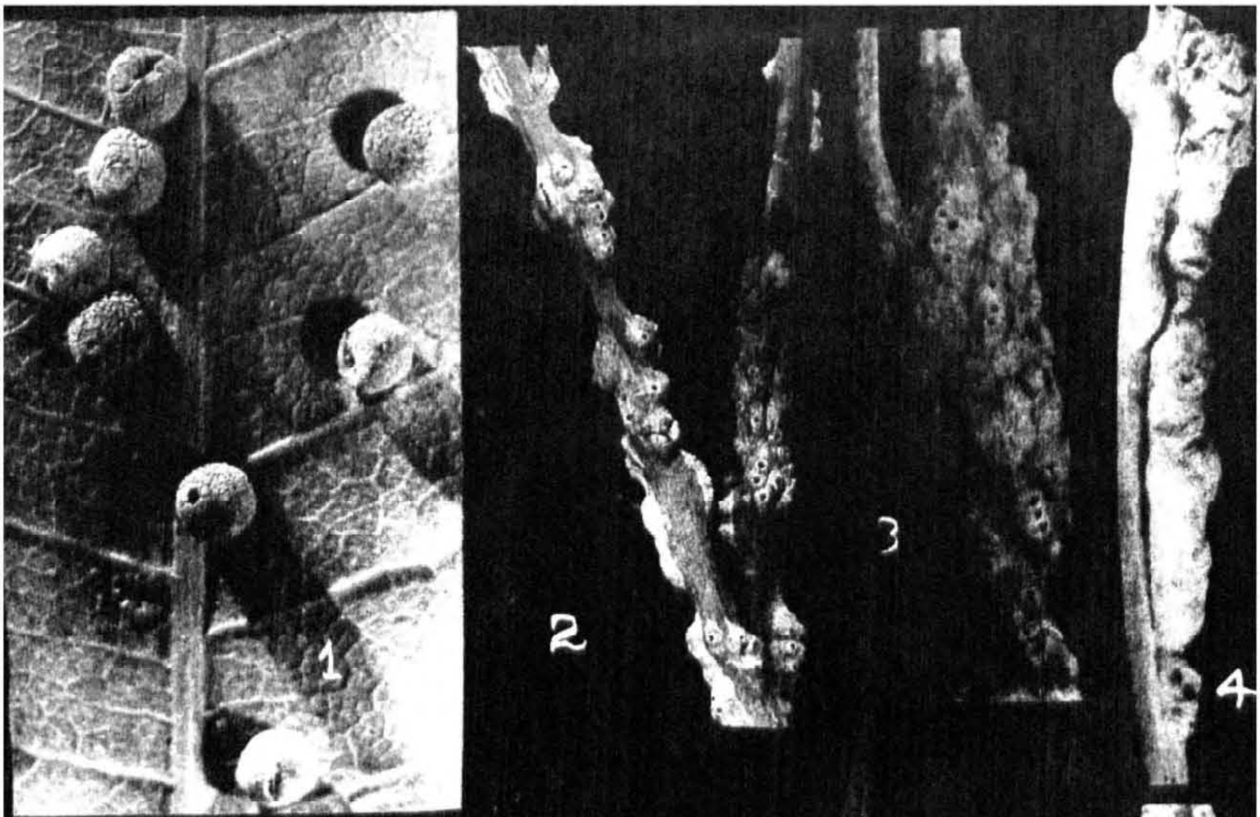


Plate V : Figs. 1-7

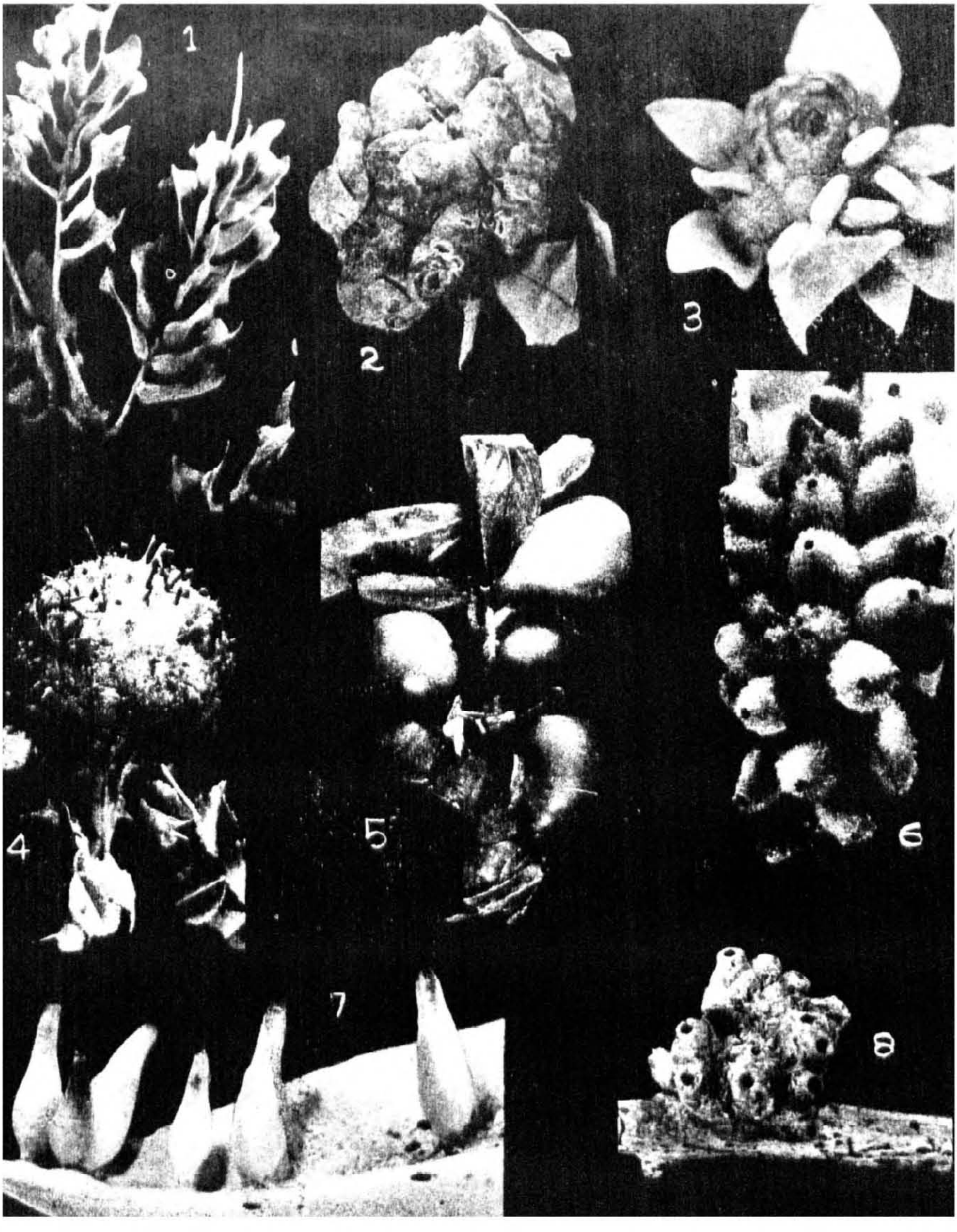


Plate VI : Figs. 1-8